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NOVEMBER, 1911

VOL. IV.

No. 8.

MODERN ELECTRICS

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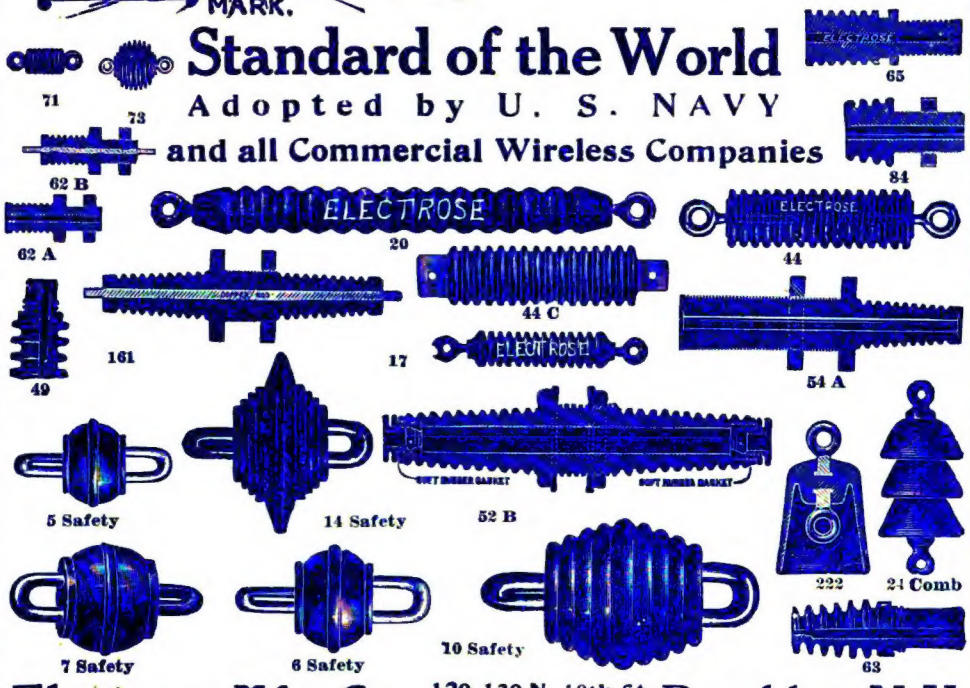

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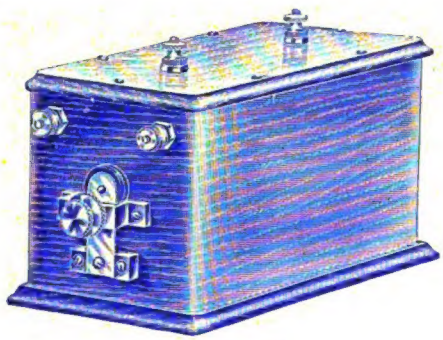

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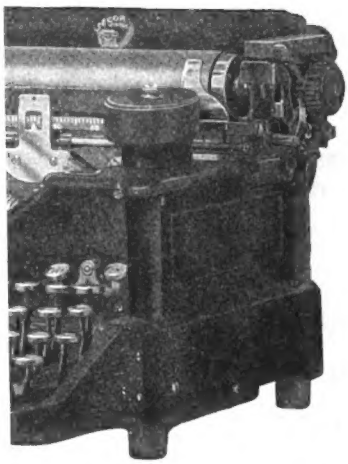

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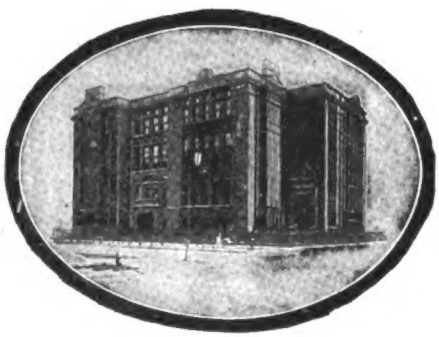

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Modern Electrics

VOL. IV. NOVEMBER, 1911. No 8.

The Practical Electrician

A Popular Course in Electricity on the Construction of Electrical Apparatus and Experiments to be Conducted with them.

By PROFESSOR W. WEILER, of the University of Esslingen, (Germany)
Translation by H. GERNSBACK

CHAPTER II.—Continued.

ACCUMULATORS OR STORAGE BATTERIES.

51. PRINCIPLE OF THE ACCUMULATOR.

AS we have seen before, when water is decomposed the positive pole takes on oxygen and the negative pole hydrogen. If after a while we disconnect the battery and connect the lead or platinum strip surrounded with oxygen, the Anode, with the lead or platinum strip surrounded with hydrogen, the Cathode, with a galvanometer, the needle will show a strong deflection; this deflection is opposed to the one we would get from the main primary current.

The apparatus for the decomposition of the water, sometimes called voltameter, consequently acts much the same as a galvanic battery, the Anode furnishing the positive pole, the Cathode the negative.

The current (Polarization current) lasts until the gases are again united to water, inasmuch as during this process nothing has been lost and nothing has been created, the polarization current being theoretically the same as the battery current. The galvanic polarization is therefore the source of an electro-motive force.

During the electrolysis of the water Schönbein observed a biting odor, which reminds one of chlorine, bromine, and iodine. This scientist also observed that this odor, which he calls Ozone, is occasioned when the oxygen is changed in its form (Allotropy). After Schönbein had shown that the formation of Ozone is not only dependent on the decomposition of the electrical current, but also on the blowing out of friction electricity from points, he found that Ozone could be obtained by purely chemical means; for instance, by burning, very slowly, phosphorus (little pieces of phosphorus covered almost entirely with water). He also found that in the presence of oxygen there is always some Ozone. Inasmuch as Ozone is found at the positive electrode, it is sometimes also called the negative or

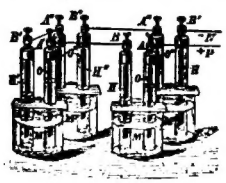

Fig. 56.

Fig. 57.

active oxygen, and the molecules are thought to be constructed in the following manner: $\equiv+$, while the molecule $\begin{matrix}+\\+\end{matrix}$—is termed antozone, and electro-positive oxygen. Many chemists regard this antozone as H_2O_2.

The gas battery shown in Fig. 56 is an invention of Grove in 1845. This battery furnishes a current merely by using gases which are shown in the tube.

Referring to Fig. 57, if one places two well cleaned lead plates in acidulated water, and if now a current strong enough to decompose the water, is connected to the plates, one observes that the oxygen O is thrown on the positive electrode (Anode). This Anode is oxi-

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dized by this process and forms on the surface a film of brown peroxide of lead, PbO_2, which adheres strongly to the lead, for the reason that it is insoluble in the acidulated water. The hydrogen, however, passes to the negative electrode (Cathode) and unites with all traces of oxygen which it finds on the plate; during this process, the plate becomes light gray. If the current is circulated through the plates awhile, and if these two plates are not connected with a wire, the peroxide of lead decomposes the water and takes on the hydrogen, while the surplus oxygen is thrown on the negative plate and oxidizes the latter. This process lasts under the production of the current, as every chemical process produces a current, and as long as the two plates are covered with oxide of lead. The two processes can be demonstrated as follows:

(1) Decomposition under the action of the battery current:

$$\underset{\text{Oxide of lead}}{PbO} + \underset{\text{Water}}{H_2O} + \underset{\text{Oxide of lead}}{PbO} = \underset{\text{Peroxide of lead}}{PbO_2} + \underset{\text{Water}}{H_2O} + \underset{\text{Lead}}{Pb}$$

(2) The voltameter as battery:

$$PbO^2 + H_2O + Pb = PbO + H_2O + PbO;$$

the sulphuric acid acts then on the oxide of lead after the equation:

$$PbO + H_2SO_4 = PbSO_4 + H_2O.$$

After a certain time, the two electrodes are again covered with oxide of lead. If, now, the battery current is connected to the plates and if the current passes in the same direction as previously, the positive electrode will again absorb a very large amount of oxygen, and the negative electrode will go over again in spongy lead and absorbs the nascent hydrogen at the Cathode. If all the oxygen which can be taken on by the negative electrode is absorbed, small gas bubbles will arise on its surface; this is called "boiling." Now our apparatus is again a source of electricity and for this reason it has been termed secondary battery.

Ritter, in the year 1803, made the first accumulator composed of copper and acidulated cardboard disc. Sinsteden, in 1854, was the first one to use lead in a storage battery, and Planté, in 1859, took up Sinsteden's work. Gmelin and Sinsteden in 1858, however, have established the theoretical basis of the accumulator.

Jakobi, in 1860, telegraphed with a secondary battery composed of platinum elements over a subterranean cable 300 Km. long.

52. PURPOSE AND USES OF THE STORAGE BATTERY.

Figure 58 shows three large storage batteries such as are used in central stations. Such storage batteries are a practical repetition of the experiments described above. Their purpose is to collect, in other words to accumulate, the battery currents or currents from a dynamo as chemical energy. For this reason storage batteries are called accumulators; they are supposed to give electric energy at any time when they are called upon to do so. At the same time a storage battery performs another important duty; it shall transform at the same time the primary current; for instance, the low tension of the galvanic battery shall be transformed to a higher tension current. After Ohm's law it is possible to transform a weak charging current into a strong discharging current, simply by decreasing the inner resistance; on the other hand it is also possible to transform a current of high tension to one of low tension by connecting the accumulators in parallel or multiple. Of course here also the golden principle of mechanics is to be applied: *What is won in power is lost in time.*

Notwithstanding that the accumulators are not cheap, and deliver only 90 per cent. of the electricity received and only give back 75 per cent. of the entire energy used in charging them (as the acid (electrolyte) is used as a conductor of the secondary current), they are able to perform important services:

1. After the generators have stopped working all the current accumulated during the day-time is to be used at night-time for various purposes—charging stations for electrical railways and electrical illumination.

2. To transform the powerful current of a dynamo to a low-tension current of long duration, such as is used in telegraphy and electro-chemistry.

3. The accumulated power that would otherwise go to waste is collected by means of a dynamo in storage batteries, this power being transformed into elec-

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tricity; the accumulated electricity is then used during a time when the usual amount of energy would not be enough to run the machinery.

4. During the hours in which a factory is not operated, a constant power (water power) is accumulated electrically, for use during the day-time.

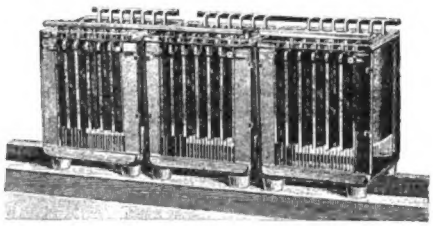

Fig. 58

5. To obtain an absolutely uniform E.M.F.; when the speed of an engine varies a great deal, which would cause flickering of the lights, a small chain of storage batteries is placed in the circuit; this acts as a sort of damper, and produces a steady light, and at the same time it increases the life of the lamps.

53. ACCUMULATORS AND CONDENSERS.

The accumulator stores the electrical energy in a round-about manner inasmuch as the energy is first transformed into chemical energy. The condenser—for instance, a Leyden jar—accumulates the energy directly. For this reason it seems to possess advantages over the accumulator. However, this is only apparently, inasmuch as a storage battery which only weighs 2½ pounds is able to hold more than a thousand times as much electricity as that contained in a condenser. For this reason it will be seen that it is not practical to accumulate electricity with condensers, if a considerable amount of energy is wanted.

54. A CHEAP ACCUMULATOR.

Fig. 59 shows the construction of the original Planté accumulator. Two lead plates with connection strips cut out from the same piece, or rolled into a double spiral as shown. Four strips of pure soft rubber, about one-quarter inch thick and about one inch wide, are used as shown to separate the plates. No dimensions are given, inasmuch as any size may be made, but for the experimenter we would suggest using plates about 25 inch. long and about 7 inch. high, not including the connection strips. Before starting to roll up the plates, it will be observed that one connection strip comes on the left side, the other to the right side, as shown. After the plates have been rolled up they will appear as shown on the left side of the illustration. The cylinder obtained in this manner is then sunk into a glass or hard rubber vessel which contains acidulated water, and this vessel should preferably have a cover which has two holes through which the two connection strips pass. To charge this storage battery two Bunsen or three large Daniell batteries are used.

The current is now turned on and the batteries are left connected until small gas bubbles rise from the plate, which has taken on a chocolate-brown color. The strip coming from this plate should be painted red and marked with a positive (+) sign, the other strip should be painted black and marked with a negative (—) sign.

Fig. 60 shows a method of charging such a storage battery. The two standards AA are connected with the positive and negative connection strip of the storage battery and the wire that stretches between them is of platinum and is used

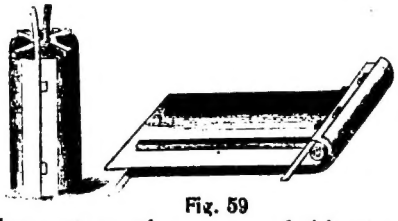

Fig. 59

to demonstrate the power of this storage battery.

When the battery is fully charged and well formed, the wire will glow in a white heat for hours. This storage battery which we have made will, however, only give a short current at its first discharge, for the reason that it is not formed as yet. Only by charging and discharging it about twenty to thirty times will it become a good storage battery, for the peroxide of lead on the positive plate is a very thin film at first, which, however, soon increases in thickness. The negative plate also must have a very large surface to be effective, as the electrical current transforms the surface of this plate into spongy or granulated lead only after fifteen or more charges and discharges. To further this

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it is quite advisable before making such a storage battery to roughen up the surface of the negative plate on the side which faces the positive plate. This roughening of the surface may be done in various ways. By means of a sharp knife, the surface may be scratched many hundred times, which of course increases the surface, or a very fine nail may be driven through the entire plate and several hundreds of such holes may be punched. The rough side of the plate thus formed is turned towards the positive plate.

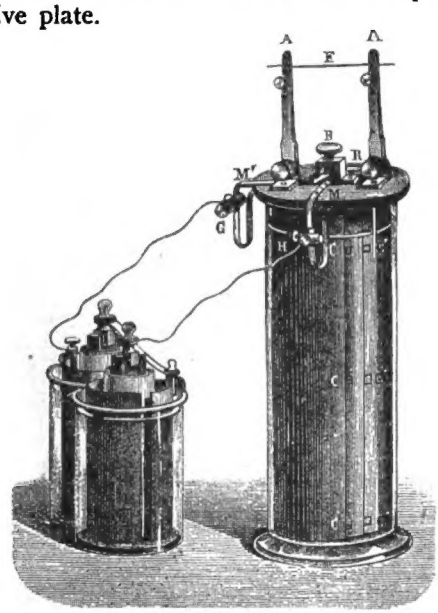

Fig. 60

An important fact to be remembered by the experimenter is that when charging a storage battery *the positive pole of the charging current must always be connected with the positive pole of the storage battery during the charging.* If this is not done the storage battery will be ruined.

Fig. 61 shows a chain of storage batteries where twenty of the previously described cells are connected to a multiple switch, which sometimes is also called Pachytrop. By means of this, simply by turning the knob, all cells are either connected in series or else in multiple. Thus Planté's battery as shown when connected in series gave 40 volts and about 20 amperes, and a long thin wire stretched between TT was kept red-hot for hours. By giving b another half turn all the cells would be connected in multiple and one now has a current of two volts and 400 amperes, and with this powerful current one can fuse heavy metal bars when the current is taken off from QQ. We have now in reality nothing but one immense storage battery. This Pachytrop has a beam of wood or other insulating material with metal strips at each side. In this manner the batteries are all connected in multiple by means of the springs rr, inasmuch as all positive springs and all negative springs go to one separate metal strip.

When turning the knob b 90 degrees all the springs of one side are connected with the springs of the other side, through thin metal rods going through the wooden beam at right angles. Thus all cells are connected in series.

Planté charged this chain with two very large Bunsen batteries, the storage batteries of course being connected in multiple. Naturally it is understood that the Bunsen batteries have to charge the storage batteries for a very long period, as each storage battery receives only a fraction of the current from the Bunsen batteries. Thus it will be seen that the low tension of the Bunsen batteries, which amounts to only four volts, is transformed into 40 volts. To explain this better, we quote herewith Planté's own words:

"By taking a wide vessel containing a large amount of water which is spread out over the entire bottom of the surface but only a few inches deep, we can obtain a thin stream of water for a long

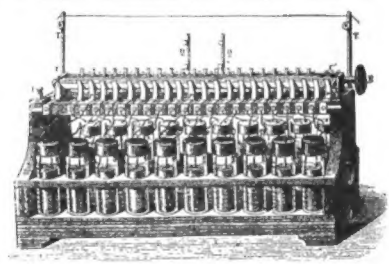

Fig. 61

period under a very uniform pressure, providing the opening is very small. Also it is to be noted that the water stream will stop abruptly as soon as the water level has reached the outlet. This is exactly like a large storage battery which is connected to a long thin wire. The wire ceases to glow abruptly just as soon as the battery has reached its discharge."

(To be continued.)

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The Electro-Magnetic Gun

By Obed C. Billman, LL.B., M.P.L.

WHILE but three patents have been issued by the United States Patent Office for "Electro-Magnetic Guns," and these within the last decade, yet it appears that the production of "Powderless, Smokeless, Flashless and Soundless Gun" received the attention of scientific men over a half century ago.

In 1845, Charles G. Page, of the Columbian (now George Washington) University, Washington, D. C., wrote an article, which was published in the American Journal of Science and Art, vol. 49, page 132, in which he stated:

"Another curious instrument is the galvanic or magnetic gun. Four or more helices arranged successively constitute the barrel of the gun, which is mounted with a stock and breech. The bar slides freely through the helices, and by means of a wire attached to the ends toward the breech of the gun, it makes and breaks the connection with the several helices in succession, and acquires such velocity from the action of the four helices, as to be projected to the distance of forty or fifty feet."

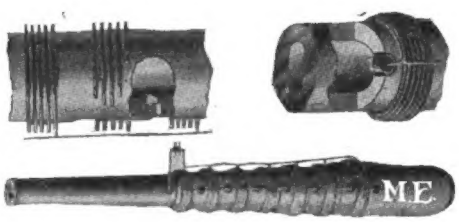
The primary principle involved in the construction of these guns consists in impelling the projectile by the magnetic action of a solenoid, the sectional coils or helices of which are supplied with current through devices actuated by the projectile itself. In other words, the sections or helices of the solenoid produce an accelerated motion of the projectile by acting successively upon it.

A principle somewhat similar is involved in the construction of electro-magnetic rock drills and dispatch tubes. Patents granted to Marvin No. 361,829 and to Bliss, No. 636,148, are instances of the former, and patent No. 259,817, granted to Cheever, is an instance of the later.

In the electro-magnetic rock drills, the plunger is moved by the action of a sectional solenoid, through the coils of which current is supplied through contacts closed by the plunger itself.

The electro-magnetic dispatch tube consists of a carrier or dispatch tube surrounded by a series of coils or helices, a galvanic battery having one pole permanently connected with one end of the coils or helices by a series of branch wires, the other end of the coils or helices being left with the circuit open, a traveling carrier provided with circuit-closing devices for completing the circuit between the open ends of the helices, and a conductor connected directly to the other pole of the stationary battery.

An advance sheet of the Consular Reports, dated February 27, 1902, contains the following brief account of an



The Foster Electro Magnetic Gun.

electro-magnetic cannon in Sweden, as given in the report by Consul-General Bordewich, under date of "Christiania, January 25, 1902."

"Prof. Birkeland (who two years ago was sent by the government to northern Norway to study magnetism, the aurora borealis, and cloud formations) is engaged in the construction of a cannon with electro-magnetism as the motive power in place of explosives. A small model of the invention throws projectiles weighing a pound with great force."

A patent was issued to Kristen Birkeland, of Christiania, Norway, for the invention above referred to, March 15, 1904, No. 754,637, and this was the first patent issued by the United States Patent Office for an invention of this class.

The application of Birkeland was filed January 2, 1902, and Samuel T. Foster, Jr., a native of this country,

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residing at Victoria, Tamaulipas, Mexico, having read the account of the Birkeland invention, as referred to in the Consular Report, filed an application for Letters Patent December 10, 1902, but owing to the difference in the construction of the guns disclosed in the two ce-pending applications, no interference was declared.

The broad claims originally filed by Mr. Foster were held to be anticipated by the Journal article above referred to, but a patent was finally allowed and issued to him February 6, 1906, for an electric gun, No. 811,913, the second patent issued in the United States for an invention of this class. One of the practical difficulties encountered in the construction of a practical electro-magnetic gun arises from the fact that modern methods of electrical calculation indicate that in order to obtain service velocities with service projectiles an enormous number of windings are required, thus involving the use of a barrel whose length is prohibitory.

Another difficulty arises from the fact that in order to give the projectile a service velocity, without an enormous number of windings, an abnormally heavy current—that is to say, a current beyond the safe carrying capacity of the solenoid—is required, and hence the temperature of the solenoid will be raised to a point sufficient to destroy it.

Prof. Birkeland attempts to overcome these difficulties by supplying an abnormally heavy current to a coil and then cutting off the current from the coil before the temperature of the coil has reached such a point as to injure or destroy it, claiming that the rate of increase of the temperature depends upon a number of factors other than the current.

Mr. Foster says, in the specification of his patent:

"All projectiles used in this gun must have magnetic properties, and projectiles of iron or containing large portions of iron are preferable. That projectile having the greatest magnetic permeability is most suitable for this gun." The Foster gun is very simple and comprises a barrel surrounded by a series of coils or helices, a series of openings arranged along the barrel and provided with insulated walls, a series of connector-plugs mounted in said openings and normally adapted to be engaged by the projectile, a series of springs mounted in said openings and adapted normally to hold the connector-plugs in contact with the insulated walls, and an electric generator connected with said helices and barrel.

In this way means are provided for energizing and de-energizing the coils or helices in regular sequential order by the projectile completing and breaking their circuits and for automatically keeping the center of their electromagnetic field just ahead of the projectile until it has reached the center of the last electro-magnetic field. When the projectile has reached the last electro-magnetic field, means are provided for opening the battery circuit and releasing the projectile of all further electro-magnetic action of the gun.

The third and last patent issued in the United States, and believed by the writer to possess many advantages over the previous ones for reasons given below, is that disclosed in Patent No. 920,709, issued May 4, 1909, to Eli M. Alderman, of Sharon, Pa., for what may be termed a "double barreled" Electro-Magnetic Gun.

While the construction of the Alderman gun embodies the primary principle of the electro-magnetic guns above referred to, namely, having the entire barrel, with the exception of the insulated portions, magnetized at the start and causing the demagnetization of each section as the projectile travels that particular section, yet the construction in other respects is radically different in that it provides an electromagnetic gun in which the barrel throughout its entire length is energized by a single kind of magnetism as distinguished from the Foster and Birkeland guns in which the opposite ends of the magnets assume an opposite magnetism or polarity. In other words, a double barreled electro-magnetic gun is provided, one barrel being of a negative polarity and the other barrel being of a positive polarity, each electro-magnet constituting a single section of the two barrels and

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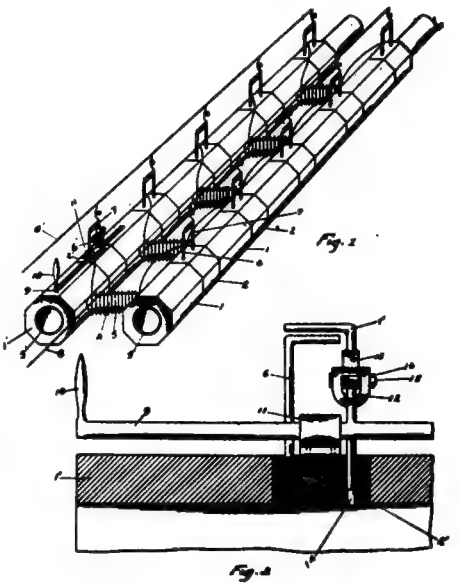
subjecting the projectile to a single polarity during its passage through the gun.

In the Alderman gun each barrel comprises a plurality of units or iron sections separated by insulating sections at suitable intervals along the barrel, said iron sections being connected in pairs by integral cores of relatively soft iron or other metal having a like property of being quickly magnetized or demagnetized. The sections of each barrel are closely fitted upon an interior cylinder or lining tube of brass or other non-magnetic metal, and the cores are suitably wound with insulated wire forming surrounding coils or helices, the opposite ends of the coils being connected to fixed posts or contact elements carried by the insulating sections. Associated with each fixed post or contact element is a movable contact member having a limited sliding movement in the insulating section, said contact element in its lower position having a right-angled top or stem in contact or engagement with the top of the fixed post or contact element while the lower end is cam-shaped and extends slightly through a hole in the brass cylinder or tube. The movable contact members are attached to wires connected to the main wires or cables, the later being connected to a suitable source of energy, such as dynamo, or the like.

It will be observed that when the opposite sliding members are in their lower position, a complete circuit exists, the current passing from the dynamo or source of electric energy through the closed switches, thus providing a circuit which will be broken as the projectile passes through the barrel and successively contacts with and raises the movable contact members.

As a means for preventing the movable contact elements from dropping back to their original positions after the passage of the projectile, thus reclosing the circuit, each barrel is provided along its upper side with a rod or rock shaft supported at suitable intervals by brackets fastened to the insulating sections, said rod or rock shaft being provided with a plurality of fork-shaped brackets carrying pivotally mounted pawls, the free ends of said pawls being in contact with the movable contact elements so that as the latter are successively raised by the projectile, the pawls will drop into notches in the adjacent contact elements, thus automatically engaging and holding the latter in their elevated positions.

As the pawls are each independently pivoted, the movable contact elements are caught and held independently of each other, but as the arms upon which the pawls are pivoted are rigidly fas-



The Alderman Gun.

tened to the rod or rock shaft, it therefore follows that by turning the handle of the rock shaft to the right the pawls will be simultaneously withdrawn and the movable contact elements released and allowed to resume their original or lowermost positions. It will be understood from the above that the construction of both barrels is similar, and that a bracket and pawl is provided for each slide or movable contact element.

In the Birkeland and Foster guns as the coil or helice is applied directly to the barrel it naturally follows that the opposite ends of each section assume an opposite magnetism. The necessary result is that the projectile in pass-

(Continued on Page 507)

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Dr. Branly's Wireless Control System

By A. C. Marlowe,
(Paris Correspondent *Modern Electrics*)

DR. BRANLY, the eminent Paris scientist, has been engaged for some time on the subject of distant control of circuits by the use of wireless. We already illustrated a number of his instruments in a former article, but at present we will mention some new devices upon which he is now experimenting. One of these is a coherer which is a modified form of his tripod coherer, Fig. 1, this having been made of a small steel tripod with

Fig. 1. New Branly Coherer.

rounded points resting on a steel disc. He finds it preferable to use a steel cylinder C and upon it is carried a supporting head O by a rod A which is insulated from the cylinder. On the head are pivoted three arms M, and these carry steel contact pieces with rounded ends so as to bear lightly upon the steel cylinder. The steel parts are highly polished for this use. The device is enclosed in a vacuum glass, and the lower part of the glass is fixed to the metal base A. Current comes to this base and also to the top head by means of the connection F. At the top is a bulb having

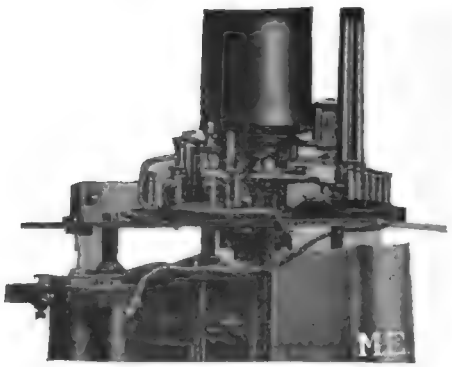

Fig. 2. Protector against Continuous Spark.

two wires S S to form a discharge gap, and the state of the vacuum can be seen by observing the discharge.

One of the main points upon which

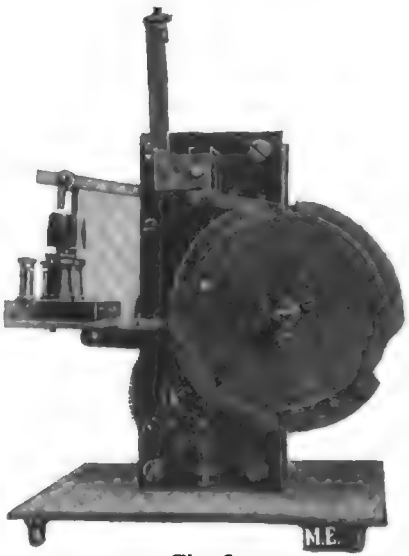

Fig. 3.

Dr. Branly is working is to obtain a device to protect the distant control apparatus from being worked by a continuous stream of sparks as might

(Continued on page 507)

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A Directive Device

By E. Jay Quinby.

IT is a well-known fact that a slanting aerial is directive in the direction indicated by the arrow in illustration 1. However, if this aerial be enlarged to one which slants equally in all directions (illustration 2), it is then "directive in every direction." It will then be possible to utilize such parts of this aerial as will produce directivity in the desired direction. It is on this

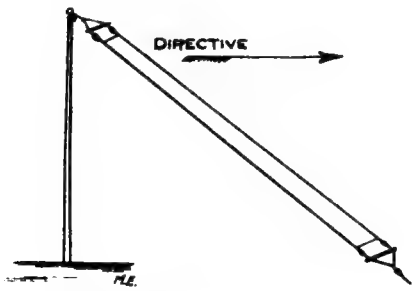

Fig. 1

principle that I have devised this apparatus for producing this effect.

On a square oak board, 12 by 12 inches, enameled black, sixteen switch points are fastened equidistant from each other and the center, as shown in the diagram. Along both the right and the left sides, are fastened eight copper jaw-posts with binding screws, and a hinge post with binding screw. A copper switch knife with hard rubber handle long enough to engage the eight jaw posts is fastened to each hinge post, and to the lower end of the board, two S. P. D. T. switches are screwed down, as shown, and a binding post fastened to the board between them. From a sheet of spring brass or copper, four and one-half inches square, cut the rotary contact blade with a pointer, as shown. Fasten this blade to a highly polished brass valve wheel, by means of a machine screw long enough to pass through the valve wheel, contact blade, board, and two nuts and washers. Wire the whole instrument as shown, and letter the points of the compass with white enamel and some brass stencils. Now for the aerial. The diagram shows plainly the type to be used. The sixteen wires should be equidistant (at the lower end) from each other and the base of the mast. Insulate them well at both ends, and carry them right down to the station, passing through porcelain tubes, glazed, or other efficient insulation, at the lead-in. Connect them exactly as shown in the diagram, being sure to have the wires in the correct rotation, and with the most northerly wire connected to N, the most southerly wire connected to S, etc., etc. Now screw the instrument to the wall, with N up, to correspond with your wireless chart.

Operation.

During storms, close both E and W switches, and throw both S. P. D. T. switches to the ground.

To send, determine in what direction the station you are going to call, is in, say East. Revolve the wheel till the pointer rests over E (but keep your hands off the wheel while sending), and call your friend. If he does not answer, close the E switch (and be sure the corresponding S. P. D. T. switch is not grounded). If he is "in" he will surely answer you then.

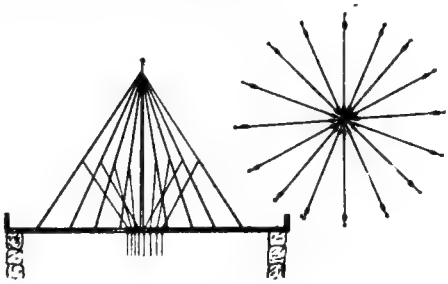

Fig. 2.

To receive: Open both the East and West switches, and throw the two S. P. D. T. switches towards each other. Leave the pointer in any position while you adjust the tuner, condensers, etc., then slowly rotate the wheel until the signals come in loudest. Observe where the pointer rests, and that is the

(Continued on Page 516.)

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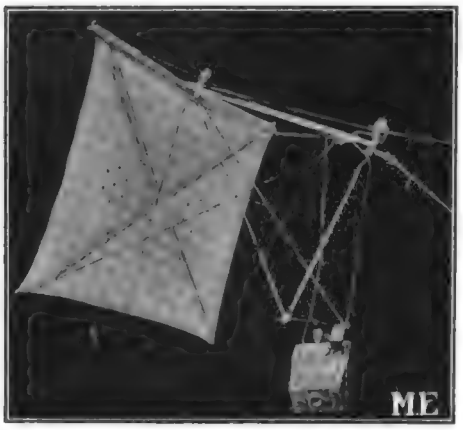
Paris Letter

KITE PHOTOGRAPHIC APPARATUS.

After extensive experiments, the following simple device called "Aero-Photo" has been perfected for the pur-



pose of taking panoramic views at great elevations by means of kites. The idea has been worked out in France, and is used with great success in the field work of the Army Corps.

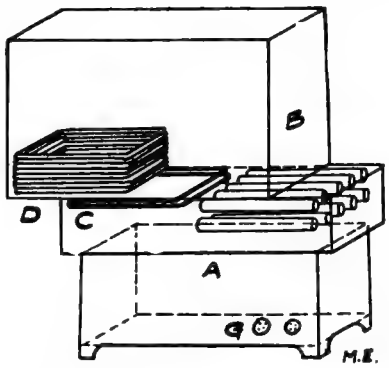
A special box kite of great lifting capacity, is sent up to the desired al-

titude with a heavy cord tied to it, in the usual manner. A small pennant is tied to the cord, a short distance below the kite, at any place desired, so that it will stop the camera apparatus at the distance wished. An aluminum framework, with ball bearing joints for great flexibility, is used to hold the camera. This framework also has a wind shield to enable it to be pushed up the cord of the kite, and is fastened to a long cord which has two electrical conductors within it. The framework has two pulleys which fit on to the kite cord. On being released, the framework with the camera rapidly ascends the cord until it reaches the pennant, where it is checked and cannot rise further to become entangled with the kite. The operator on the ground then presses an electrical button which sends the current from several batteries through the conductors in the cord, and closes the circuit of a small electromagnet fastened to actuate the camera's shutter. In the more elaborate form of this apparatus, a small parachute is released when the shutter has opened, and falls to the ground as a signal that the camera has operated. The framework with the camera can then be pulled down the cord, while the kite is still flying, and after being reloaded with another plate and again prepared for the next exposure, allowed to ascend the cord and the same operation repeated as before.

MARCONI PORTABLE SETS.

The Marconi portable sets have incorporated a novel feature in the form of transmitting loose coupler which they employ.

The high and low frequency apparatus are placed in box A, and the aerial circuit and receiving apparatus



placed in box B. Primary C and secondary D of the transformer helix are thus placed in two boxes, and by

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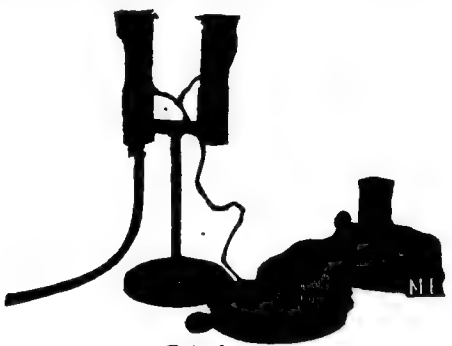
sliding one box over or further away from the other, the degree of coupling is changed.

AN ELECTRICAL CALORIMETER.

Prof. Charles Fery, of Paris, has designed a clever and efficient calorimeter, in which electricity figures largely. His apparatus consists of a gas meter, a pressure regulator, and a thermo pile connected to an electrical measuring instrument, all as shown in the accompanying illustration.

The thermo pile consists of two joints of nickel-constantin, an alloy composed of equal portions of nickel and copper. These thermo piles are placed at the top ends of both tubes which are opened at the top. The gas flame of which we wish to determine the caloric value, is placed in the bottom of one tube, which has a burner



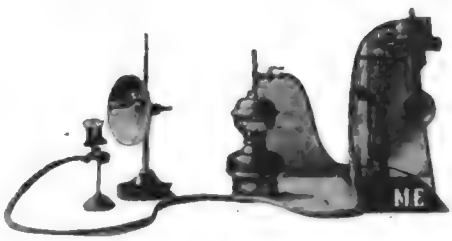
Calorimeter.

and the connecting rubber tubing. For liquids, a lamp is used in place of the burner. The air needed is brought in through the top openings. The difference in temperature of the two parts of the pile gives a difference of potential which is observed on the sensitive galvanometer or other electrical measuring instrument connected to the piles. By a careful system of calibration, the scale on the instrument may be marked in heat units, so that all future tests can be read directly in heat units, doing away with the necessity of calculation. To measure the gas efficiency, so many feet are passed through the gas meter, and the reading taken by the electrical instrument, giving the caloric value of the gas tested. This apparatus may be applied in numerous other ways to good advantage.

WIRELESS TELEPHONY BY MEANS OF LIGHT RAYS.

M. Ancel, a Paris scientist and constructor, is engaged on experimenting in telephony using light as the means of conveying sounds between separated points.

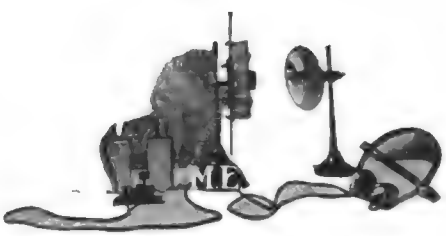
The sending apparatus consists of a gas generator of the acetylene type,



Transmitting Set.

which feeds several burners placed in front of a parabolic reflector for concentrating the light. The tube leading to the burners is intercepted with a gas chamber containing a membrane, which is moved by sounds in the mouthpiece. This fluctuates the light of the burners.

The receiving end contains a parabolic reflector which concentrates the rays of the burners (at the sending end), on to a selenium cell. A battery and telephone receiver are used in connection with the cell, and the variations at the sending end are reproduced in the form of sounds in the



Receiving Set.

telephone receiver. Excellent results have been obtained by this means, though the idea is not entirely original, having been tried by Graham Bell, the inventor of the telephone.

MEASURING THE HEATING POWER OF THE SUN.

Messrs. Fery and Mellochau, of Paris, have developed an interesting

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electrical appliance for measuring the heat radiated by the sun. This apparatus has been used on Mt. Blanc with success.

It consists of the following parts, shown in Fig. 1. C is a metal cup, preferably of copper, which has its concave face blackened. This part constitutes the heating portion of a

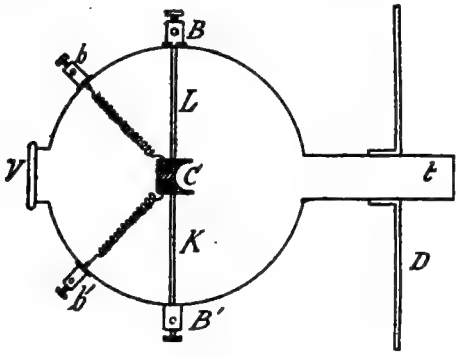


Fig. 1.

thermo pile. The couple is formed with two rods, one of which, L, consists of brass, while the other, K, consists of Constantin metal. The small

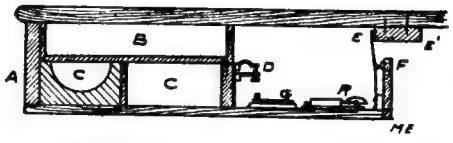
Fig. 2. Apparatus to Measure Heat of Sun.

copper concave surface C, receives the concentrated sun's rays through t. Behind C is a spool containing many turns of fine wire capable of producing heat when current is passed through it, with connections at b and b^1. Ground glass is placed at V, so that the observer may center the shade of C to insure the full effect of the light coming through t. D consists of a cork shield, covered with tinfoil, so that all the heat will be deflected from the outside casing of the apparatus. To B and B^1 the wires are connected from an electrical galvanometer.

To calibrate the apparatus, current from batteries is passed through the coil of resistance wire, through binding posts b and b^1. By measuring the watts expended, a curve sheet may be drawn giving the deflection for different current values. The apparatus is then pointed to the sun, and a reading taken of the galvanometer deflection. The "Sun's constant" is therefore found by the number of watts needed to give the identical deflection on the galvanometer caused by the sun's rays. Inasmuch as the comparison of calories and watts is known, we can then pass on from watts to calories and complete the calculation.

CASH DRAWER ALARM.

In the accompanying drawing, we have a simple means of ringing a bell when a cash drawer is opened, and when the upper portion containing the coin is pushed back to expose the bank notes.



A bell R is connected with various contacts. E is a spring which normally rests against wooden block E^1, thus keeping it away from the contact F. This spring is connected in series with the bell R and batteries. On opening the drawer, the spring E presses against the contact F thus closing the circuit and ringing the bell. B is an upper drawer, and D is a small spring fastened to the lower one, and normally separated from the lower contact. However, when the draw-

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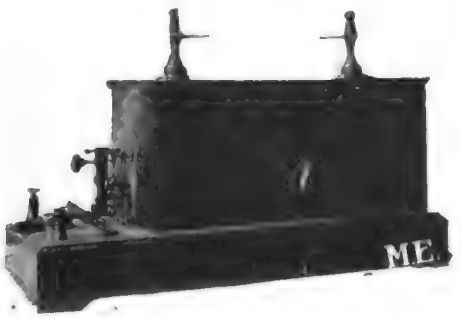
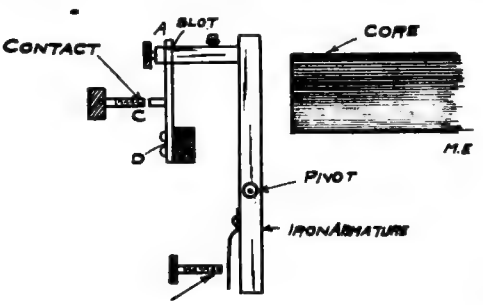
er B is pushed back, it presses on the contact D which closes a circuit again causing the bell to ring. Switch G disconnects the contact D when desired.

AN EFFICIENT INDUCTION COIL.

A highly efficient induction coil has been designed by M. Ancel, the excellent results being largely due to the improved form of vibrator interrupter used. With 10 volts and 3 to 4 amperes, it is possible to obtain a 25 c.m. spark, which is equivalent to 100,000 volts.



The accompanying diagram illustrates the principle of the vibrator used, in which the iron armature en-



Details of Vibrator.

gages the part B, which in turn fits through the slotted tongue A having a small weight D at the end of it. This makes a quick break at contact points C with each movement of the iron armature, which is pivoted as shown.

Another form of apparatus designed by the same constructor, is the high frequency apparatus demonstrated in the photograph herewith. The two Leyden jars, and glass covered spark gap are readily noticed. The high frequency coil has a slide on the pri-

Improved High Frequency Apparatus.

mary turns so that perfect reasonance may be obtained.

HANNIBAL AMATEUR WIRELESS CLUB.

The Hannibal Amateur Wireless Club was organized on April 14th, 1911, with the following officers: Chas. Cruikshank, president; J. C. Rowland, vice-president; G. G. Owens, secretary, and Wm. Youse, Jr., treasurer.

The club has recently taken a large step in its advancement, by acquiring a club room in the Y. M. C. A. Building, through the support of a local newspaper.

While all the stations of the members are equipped with satisfactory receiving sets, they have but one station that possesses a long distance sending range, and uses the call WY. Anyone within a receiving or sending range of the club stations, is requested to communicate with them by aerogram or letter to the secretary, care of the Municipal Electric Light & Power Co., Hannibal, Mo.

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A Magazine devoted entirely to the Electrical Arts.

H. GERNSBACK, Editor
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Vol. IV. NOVEMBER No. 8

EDITORIAL.

WITH this month we are beginning our new department "With the Inventor," as announced in our October issue.

While this department is not as complete as yet, as we desire to make it, we hope that it will be welcome to most of our readers. We shall be pleased to receive any suggestions on this new department and shall welcome any criticism, as it is our ambition to make this department one of the most important ones in our magazine, which it should be, as it treats on an important subject.

With the next month's issue we shall have several distinct improvements in the make-up of our magazine, and will also use somewhat smaller type in order to give more matter to our readers, which we cannot do at the present time on account of the large type used.

We have received several hundred suggestions for a new cover in response to the advertisement in our October issue, and we are very much impressed by the lively interest some of our readers have taken in this contest.

While some very fine designs have been submitted it was not possible as yet to come to any conclusion as to the winner and the Editor has thought it best to continue the contest for another month, which probably will bring out further ideas.

Prospective contestants should bear in mind that in all cases would we want the top part of the design now running on our cover, which is the same one used at the top of this page. We have used this design for years and have come to the conclusion that it is about as good as any one that can be gotten up, and until we find a better one we will continue to use the old one. When submitting further sketches kindly bear above in mind and also be sure to have your name and address on your sketch.

Will Mr. F. A. Zumwalt have the kindness to forward his address, which was left off his design, to this office?

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Ralph 124C 41 +

(Continued.)

By H. Gernsback.

SYNOPSIS OF PRECEDING INSTALLMENTS

Ralph 124C 41+, living in New York in the year 2660, while in conversation with a friend at his Telephot, an instrument enabling one to see at a distance, is cut off from his friend and by mistake is connected with a young lady in Switzerland, thus making her acquaintance by Telephot.

The weather engineers in Switzerland who control the weather decided to strike against the Government and turned on the high depression of their Meteoro-Towers, thereby snowing in a large district. An avalanche threatens to sweep away the house in which the young Swiss lady, Miss 212B 423, lives and she appeals to the great American inventor, Ralph 124C 41+, to save her, which he promptly does by melting the avalanche by directed wireless energy from his New York laboratory.

The inventor on the same afternoon is given an ovation by distance, in which the Telephot plays a great part. Afterwards he reads a "newspaper," the size of a postage stamp, and "writes" a lecture by means of the Menograph, an instrument by means of which words are made to appear on a paper tape by impulses from the brain acting on the apparatus. During the night his head is connected electrically to the Hypnobioscope, an instrument by means of which words and sentences are transmitted directly to the brain while one sleeps, in such a manner that everything can be remembered the next morning.

The great inventor, the next day, is visited by Mr. 212B 423 and his daughter from abroad. Both arrived by means of the Subatlantic Tube, piercing straight through the earth from New York to Brest in France. In the afternoon in presence of his guests and twenty professors from all over the globe, 124C 41+ brings life to a "radiumized" dog, who had been killed three years previous in presence of the twenty professors. The dog had been preserved with the rare gas Permagatol and Radium-K bromide, which latter occupied the blood vessels of the dog for three years.

124C 41+ then proceeds to show Miss 212B 423 wonderful New York. Both put on "Tele-Motor-Coasters," propelled by wireless energy and roll about the town. They then visit the new electric restaurant; the "Scientificafe," and enjoy a lunch of semi liquid food, supplied through tubes. Afterwards they see the monument of the last horse to die in harness in New York A. D. 2096.

Both then proceed in an aerocab to the National Playgrounds of New York City, located on Long Island where Montauk was formerly; they cover the distance in 10 minutes. They then play tennis and the charms of Miss 212B 423 keep 124c 41 spellbound. Finally when the young lady's wonderful long hair comes down by accident, 124C 41 takes a solemn oath that he can never be happy without her. Both afterwards visit the Helio-Dynamophore plant which is operated by the Sun's heat, transforming heat directly into electricity. This plant lights all New York and furnishes its power. In the evening 124C 41 entertains his guests in his Tele-Theater i.e. theater by distance. They hear and see the new play "La Normande," playing at the "National Opera" four miles distant from 124C 41's house.

The entire party then proceeded to view New York by night. They entered a store and the young lady was much impressed with the automatic electric packing machine, which makes metal boxes while you wait, fitting the size of the package. This box, by means of a Packet Post Conveyor, running under the street, delivers the package automatically to the residence of the purchaser a few minutes after purchase has been made. The young inventor then took his guests up 10,000 ft. over New York, where they view the Signalizers which are search lights turned sky-ward. These signalizers are used to signalize flashes to aerial liners far out at sea. The entire party then witnessed an aerial carnival, composed of six thousand aerial flyers all flying together at the same speed, the flyers being lighted up on the bottoms. Thus they view an immense American flag and various geometrical figures, etc., all outlined by the lighted up aerial flyers. Afterwards 124C 41 takes his guests to his Bacillatorium by means of which Arcturium rays are shot through the human body which kills any germs or bacilli and thereby lengthens life considerably.

Letter from Vilonette 88B 90 to her friend Alice 212B 423.

Ardois-au-Lac.

August 35th, 2660.

DEAREST:

Since I talked to you over the 'phone the other day several things have occurred and I thought it best to let you know at once; I am sending this by the sub-Atlantic tube so it will surely reach you in the morning.

Now, dearest, don't be upset, because I think everything will be straightened out satisfactorily in the end.

Who do you think came in yesterday? You will never guess, or perhaps you have guessed already: Fernand 60O 10! Of course he was the last person on earth I expected as a caller since our scrap two years ago, and I plainly showed my surprise. He was of course smooth and well-mannered as he always is, as long as everything goes the way he wants it to, and for that reason I was as snippish and cattish as I could possibly be; but it did not seem to disturb him in the least. After a while he cleverly managed to turn the conversation to you, and I knew at once the object of his visit was to get information about you. I consequently was well on my guard, as you may imagine.

He of course was aware that you were in New York at the present, and he also knew that you and your father were the guests of Mr. 124C 41. He asked me when you would return and I told him I did not know. He then wanted to know if I could find out for him and I said I would try.

I would not have thought much about his visit were it not I did not like the ugly look that came in his eyes every time he mentioned 124C 41, whom he seemed to hate from the depths of his heart, (if he has such an organ).

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If Fernand thought that before your departure he had at least a ghost of a chance with you, he seems to think now that your famous Yankee friend has spoiled even that slight chance, and he naturally feels bitter towards him, I imagine.

I know of course, dearest, that you don't care for Fernand, but I thought best to advise you. And what do you think? This afternoon I heard my brother tell one of his friends that Fernand is leaving for New York to-night! Hence I wrote this letter, as I could not reach you by 'phone. I suppose he will call on you to-morrow, so be on your guard.

Let me know soon, dearest, I am anxious to learn developments.

In haste, your loving VILONETTE.

N.B.—Thanks for the samples of the netting. If not too much trouble, kindly send me five meters of netting as enclosed sample. I would prefer the color to be dark antique green-oxidized, though; the enclosed sample shows the alomagnesium color too much, and you know that color is not becoming to me,

---

Translation of code letter of Llysanorh' CK 1618 *to his friend Rrananolh AK42*

New York,
September 20, 2660.

DEAR FRIEND:

Although I am booked on the *Terrestral* which departs to-morrow, I have cancelled my reservation and consequently will not arrive on Mars November thirty-first as planned. I do not know if I will book on the next transport, in fact I don't know where I am at. My case seems hopeless. I should never have come to this earth. As you have guessed already—it's love at first sight. Never mind her name. You who have never visited this planet cannot understand, consequently it does not matter. Inasmuch as intermarriage of Martians and Terrestrals is forbidden by law, here as well as on Mars, this makes it all the more hopeless for me. I have tried everything to free myself—in vain. Chemicals and Radio-treatments seem only to accentuate my longing for the wonderful creature I love so madly, and I know by this time that I can never free myself. The good part is that she does not know how violently I love her, as I have always been careful not to betray myself. I know she likes me, but she very probably does not love me—in fact I can only hope that she does not; it would only heighten my agony to know that she should have to suffer on my account.

I will, I suppose, go the way of all Martians who fall in love with Terrestrals. There is no return. A little Lisadinide injected under the skin will free me from all. Don't be shocked—you know my strong mind. If I could get out of it, I would, that is all there is to be said. I have lost and admit it.

Please hand enclosed documents to my Second and break the news gently to him. I have arranged everything of importance and there is nothing I can ask you to do for me. Please do not mourn me, but keep me in mind and think sometimes of

Your unhappy friend,
LLYSANORH'.

Letter from Fernand 60*O* 10 *to his friend Paul* 9*B* 1261.

New York,
September 28th, 2660.

DEAR PAUL:

Well, everything is fine—for everyone else except for me. However—you know me—I am not downed so easily. Fact is, I might just as well run against a steelonium wall as against Alice. One is as hard to conquer as the other. That, however, is to my liking. I love obstacles, especially if they are as pretty as Alice. I never wanted her more in my life than now, now that she has thrown me down. I suppose if she really had given me encouragement I would not care a lot for her. Now it is different. I will have her. I will make her love me and I will use force to gain my end.

I have told you already of Llysanorh', the funny Martian. It is too funny to see him look at Alice with his big black horse eyes. I do believe he really is in love with her, but these Martians certainly can control their emotions.

If Alice should ever take a liking to this lanky seven foot Llysanorh', she'd be lost to me, Ralph, and the rest of the world. That fellow certainly can be sugary if he wants to. However, I really think she loves that crazy Ralph scientist and, as I said before, between him and that Martian I have absolutely no chance. I know Alice could learn to love me if she really knew me well, but she never

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had an occasion. I am going to provide for that occasion. Yes, I will carry her off. Everything is arranged. If I am successful, I will take her out into space for a few months. My machine is in readiness and I have even a well trained maid for her on board. The machine is the latest type, the finest I've ever seen. Provisions, books, reels for the Hypnobioscope, instruments, etc., in fact everything you can think of is on hand and I assure you Alice won't find it very lonesome. Besides, I flatter myself as being a good entertainer.

The purpose of this letter is to ask you kindly to attend for me to the several matters as per enclosed rolls. You will understand everything after you read the instructions. I do not think I will be away longer than three months at the latest and you will see from the gray document that I empower you to take charge of my affairs. I thank you in advance for your pains. Now I must close; I will send you a message from on board the machine if everything goes right.

Sincerely yours,

FERNAND.

* * * * * * *

It was a beautiful night. The moon was full and the early autumn air was invigorating.

Ralph 124C 41 and Alice 212B 423 were enjoying a ride in a two-seated aerocab above the ocean, in the neighborhood of New York. This was one of Alice's favorite diversions and both enjoyed these rides immensely.

For some time already both had stopped talking. During the weeks of their acquaintanceship both had not lost time studying each other thoroughly. They had the same likes and dislikes for most things, and they usually agreed on the most vital subjects. They were moreover extremely sympathetic to each other, so much indeed that each one when blind-folded or in the dark could tell the presence of the other in a room full of people without difficulty.

The great scientist 124C 41, who two months ago was an avowed enemy of the fair sex, had at last been conquered. The great scientist had been turned into a meek lover, and he had, moreover, forgotten his own lectures ridiculing love as being nothing but a "Perfumed animal instinct." Ralph, the lover, had indeed changed his mind on the subject. Alice, who for sometime past had watched the moon with a dreamy expression in her eyes, was building aircastles—a favorite habit of hers. In fact she was so engrossed in a lovely pink dream with baby blue edges on it that it was some time before she became aware that Ralph had taken her hand into his. She had never held hands with anyone in such a shocking manner and consequently withdrew it violently—in her imagination. However, as the novel feeling of holding hands with a very sympathetic young man was surprisingly delicious, she actually did not, of course, withdraw her hand violently. Quite the contrary. She sat perfectly still and both for a time enjoyed the thrill of the sympathetic flux surging back and forth between them through the clasped hands.

Centuries back on a like occasion the young man would have said or perhaps whispered a lot of sweet as well as foolish things—and thereby most likely have spoiled the whole effect. He would of course have asked her if she wanted to be his wife, if she would love him all her life, and other equally unnecessary questions.

Ralph and Alice, however, being highly advanced beings with the refinement and culture of past civilized centuries behind them, neither talked nor whispered. Sitting close together, the exchange of their thoughts was attended with no difficulty. Both felt in the same manner, both understood and thought through similar channels.

By and bye their two other hands met and clasped and still further by and bye their lips met, and neither of the two spoke. In fact speech had become impossible, obsolete. Both were electrified; every nerve in them tingled and pulled and vibrated. They were not sitting in an aerocab any longer, they floated in a rose-red sea of delicately scented emotions, in which time stood still. Their ears heard nothing but far-off sonorous chimes, ringing and singing in regular intervals—at least that is what it sounded like to them; what they did hear, or rather feel, however, was the rhythmical beating of their hearts. Just how long they floated on the sea of their emotions and just how long they heard the chimes in each other's hearts is difficult

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to ascertain, as no authentic report on these subjects is available. It is, however, well known that both were brought back to earth, or rather to their aerocab, by another aeroflyer, which hailed their driver, asking for assistance. The strange flyer seemed to be having trouble with its motor and asked permission to draw up to our friends' cab, which permission was of course granted. When the two cabs had made fast, the driver of the aeroflyer asked the other driver for a few copper connectors which would enable him to repair the damage. Ralph, who had his head turned away, annoyed by the unpleasant interruption, was holding the left hand of Alice, as if he were loath to break away even for a second. He suddenly became aware of a sweet, pungent odor, which rapidly became sickening. He tried to turn his head to ascertain where the odor originated, and everything was blotted out. . . . . .

When Ralph awoke the moon had sunk low to the horizon. He was unspeakably tired and felt sick and nauseated. For a time he stupidly looked down into the ocean. Then suddenly with a rush his full senses and vitality came back. He sat up straight in his seat, looking around him in bewilderment. Only then did he notice that the seat near him was empty. He cried out in rage and agony at this discovery and only restrained himself with the greatest effort.

The driver, his hands on the steering disc, sat rigid in his seat, his head low down on his chest. Ralph opened the glass window in front of him, and with an uncertain hand shook him by the shoulder. The air blowing his way carried a strong odor of chloroformal into his nostrils, which made him deathly sick for a few seconds. The cab was still flying at its former speed and Ralph saw that it was imperative to bring the driver back to life, if a dreadful collision was to be averted. In a few minutes, however, the driver had regained his senses, and Ralph ordered him to rush to New York at top speed.

Ralph was in a terrible rage. He had become entirely transformed.

"Only that devil 60O 10 could perform such a dastardly, cowardly trick," he muttered between tightened teeth, "but I guess he doesn't know whom he has to deal with!"

He jumped up, pulled his coat off and threw it overboard; the glass doors, cushions, matting, the hood of the cab, everything that could be wrenched loose he threw into the ocean below. The cab, thus greatly lightened, forged ahead at a tremendous speed and in a short time Ralph jumped on to the landing platform on top of his tower.

He immediately cleared for action and within thirty minutes after he had regained his senses every detective and special agent was on the lookout for the kidnapper and Ralph's stolen sweetheart. Ralph had immediately transmitted Alice's photograph to the central office, where it was placed before a telephot which connected wirelessly with every special agent and detective of the entire force. Each had a portable instrument on which Alice's face was projected for ten seconds; during this time her features had been strongly impressed upon each member of the force.

However, it was soon revealed that nobody had seen or heard of the kidnapper or of Alice.

At the hotel where 60O 10 stopped, the information was obtained that the gentleman in question had left three hours ago with his baggage. His destination was unknown.

"I knew it!" Ralph muttered. "Nobody but he would do it, the low-down dog. But just wait!"

On second thought it occurred to him that it might be of advantage to visit the hotel, and, as it was only a few blocks off, Ralph flew over to it, leaving his assistants in charge of his wireless stations, with strict orders to record each and every message, to tune into everything, and to take the messages down on the recorder disks.

At the hotel he was recognized at once, and as the news of his bereavement had traveled all over town like wild-fire, he was treated with more than the ordinary deference which his high office brought with it.

He closely questioned everyone and then wanted to see the rooms which Fernand 60O 10 had occupied up to only a few hours ago.

The rooms were not straightened out as yet, and Ralph asked permission to

(Continued on Page 516.)

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New Electrical Appliances

AN ELECTRICAL STERILIZER.

Among the many electrical appliances placed on the market by the Presto Electrical Manufacturing Co., of San Francisco, Cal., the electrical sterilizer is probably one of the most unique.

This apparatus, while very efficient in its duties, is simple in construction. It consists of a glass jar with a metal base and cover, into which is placed a small metal screen tray for holding the instruments or material to be sterilized. An electrical heating coil with a long handle and cord wired to an attachment plug, is placed in the bottom of the jar, and water poured to cover the wire basket completely. The small tray is removable, and may be used for other purposes if desired.

New Sterilizer.

The water in the sterilizer will be brought to boiling point within three or four minutes, thus sterilizing the apparatus or material contained, within the minimum time possible. By using the heating coil in other containers, liquids may be warmed or boiled at will.

Inasmuch as the sterilizer is made of glass, it is far cleaner and more sanitary than metal ones can ever be. The trouble experienced with constant leaks is likewise obliterated. While indispensable in hospitals, this apparatus should appeal to dentists and physicians who are seeking to have the best of equipment in their offices.

AN ELECTRIC HAIR DRYER.

A clever application of the electrical current is in the form of a hair dryer. The apparatus not only furnishes a steady current of air, but the temperature of the air may be regulated at will.

The hair dryer consists of a small motor driving a blower. In the large tube leading from the blower, a heating unit made of many turns of resistance wire is placed, with a rheostat in the circuit for regulating the temperature. The motor is of the very best construction, with the best of materials used, insuring perfect satisfaction under the worst treatment. One of the illustrations shows the apparatus placed in its carrying case, while the other

Air Dryer in Action.

cut illustrates the method of using same.

CLOTH PINIONS.

Cloth pinions are highly successful devices for reducing the noise and increasing the life of power transmission gearing. Metallic gearing, especially steel, is always more or less noisy in

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operation, the noise becoming particularly troublesome in the case of high speed gear trains. Furthermore, iron or brass gearing has not sufficient elasticity to successfully withstand the shocks or back lash caused by the torque variations incident to the operation of machine tools such as punches, shears, planers, etc.

A Cloth Pinion.

In order to overcome these drawbacks various kinds of non-metallic substances such as rawhide and paper, have been used instead of brass and cast iron for one or more members of gear trains, but the results have been only partially successful. As a rule pinions made of such substances were not sufficiently impervious to moisture or unaffected by exposure to heat, and in the case of rawhide were liable to injury by rats and mice when kept in stock.

A Large Cog Wheel.

In the cloth pinions developed by the General Electric Company, those defects are entirely eliminated both by the nature of the material and the method of construction employed. The blanks from which the pinions are cut consist of a filler of cotton or similar material confined, at a pressure of several tons to the square inch, between steel "shrouds" or side plates, the whole structure being held together by means of rivets, or, in case of very small pinions, by threaded sleeves. After the teeth are cut the cloth filler is impregnated with oil. Cloth pinions are entirely impervious to moisture, unaffected by changes in atmospheric conditions, and absolutely vermin proof.

GERMAN DANGER SIGNS.

The following two cuts show signs which are used now everywhere in Germany and it is surprising that these deserving signs have not found their way to the United States.

The words *"Hochspannung! Lebensgefahr!"* translated, literally mean "High Voltage! Life Danger."

No. 1.

These signs are usually about two feet long and about one foot high, and are nailed or otherwise attached to posts and towers carrying high tension cables or wires. These signs have proven very popular in Germany, and everybody is well acquainted with them and knows their meaning. In fact, they have become known so well that the wording is not deemed necessary any more, as is shown in illustration No. 2. Everybody knows what this sign means.

No. 2.

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The background in Fig. 2 is in bright red (the so-called electric red), while the broken arrow is white.

AN ELECTRIC SHOE CLEANER.

The Swiss firm, Electro-Mechanic Co., has perfected an interesting slot machine for cleaning and polishing shoes. Many novel ideas are represented, making the machine probably the most successful thus far produced.

Fig. 1. Electric Shoe Cleaner.

Fig. 1 gives the apparatus completely closed and ready for service. The shoes of the customer are placed over the brushes which are revolved by an electric motor. A suction fan removes the dust from the brushes as well as the unpleasant odor, which passes to the outside of the building. On dropping a coin in the slot, the brushes begin to operate, and after one minute the motor stops automatically. In wet weather when the brushes are apt to become wet from the shoes, a blast of hot air is supplied, drying them after each shine. The blacking is applied to the brushes by pressing a push button on the face of the cabinet. Soles and all of the shoes are both polished and cleaned. The motor operates at 3,000 R.P.M., and the ventilating fan is operated on the same shaft as the brushes, requiring in all about 1-10th h.p. The coins

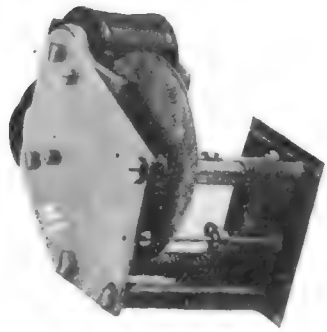

Fig. 2. Relay.

dropping into the slot, pass a counter and a contact closing device, which closes a relay which in turn sets the motor going. The starting current of the motor goes through an electromagnet causing the coin to be drawn from the slot into the receptacle meant for it. The time switch consists of a

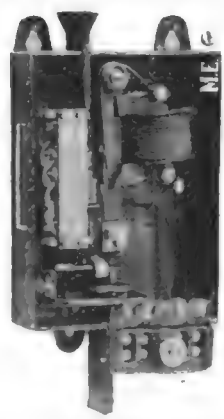

Fig. 3. Coin Contact Device.

very small motor, which is winding a spring during the polishing process. At the end of a minute, the motor has reached the end of its task, and the spring releases and makes a quick break of the switch. By using the relay, the necessity of breaking heavy currents at the main switch is done away with.

Fig. 2 illustrates the device used when the apparatus is to be operated on 3 phase current. In these instances, all three phases are controlled. The apparatus shown in Fig. 2 is the relay used on these circuits, and the two coils are connected just as volt

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meters are wired on three phase circuits, the fields being made to lag 120 degrees. The two fields act on the same metal disc on the shaft exerting a torsion.

Fig. 3 illustrates the counter and the contact device for the coins. Fig. 4 is a view of the apparatus partly opened for inspection.

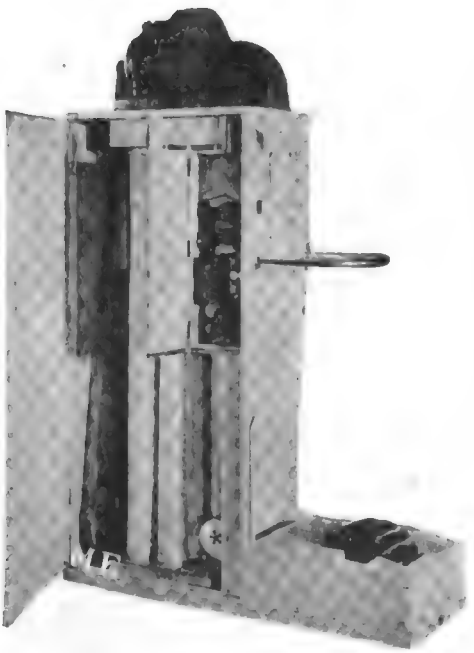


Fig. 4. Shoe Cleaner, Open.

Similar devices have been tried in this country in the past, but all proved unsatisfactory in service. Perhaps the one which we have just described will overcome the many difficulties through its many improvements, and ultimately be placed in the market on an extensive commercial scale.

A TWO VOLT DRY CELL.

A novelty in the line of dry cells, is the new product which has been placed on the market by a Chicago concern. The new departure is in the form of a dry cell of the regular size which will give out 2 volts and a heavy amperage. The battery has remarkable recuperative powers, and one cell will ring a bell continuously for eight weeks, with a four minutes' rest at the end of each two weeks. The manufacturers claim that their cells have absolutely no degenerating action when not in use. A valuable idea is the blank space left on the labels, where the date is written by the customer when the battery was installed, so that a proof of the efficiency of the cell may be demonstrated.

DURALUMIN.

A modest, yet important invention, is the production of a metal alloy, having the same weight as aluminum, yet possessing the same tensile strength as medium steel. It is similar appearing metal as aluminum, and takes a brilliant polish identical to nickel plating. The specific gravity is 2.8, while the melting point is 650 degrees C.

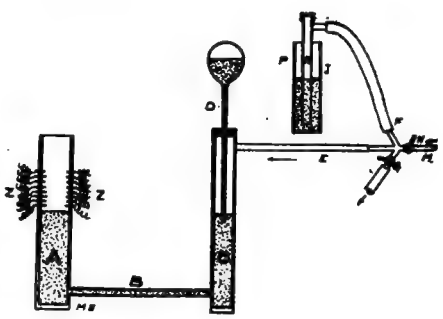
It is easily machined, and can be obtained in bars, sheets, and rods of any dimensions. It can also be supplied in any special shapes desired. The demand for such metal should be particularly strong from airship builders, aeroplane constructors, and all parties seeking a strong and light construction material.

THE INTERNATIONAL AMPERE SIGN.

The algebraical sign "C", which has been in use for many years, has recently been changed to "I", which will be the recognized sign used in denoting amperes in equations.

DISTANT CONTROL OF RHEOSTAT.

In ovens or other closed places where a rheostat is so enclosed that it



cannot be controlled, the following apparatus is suggested.

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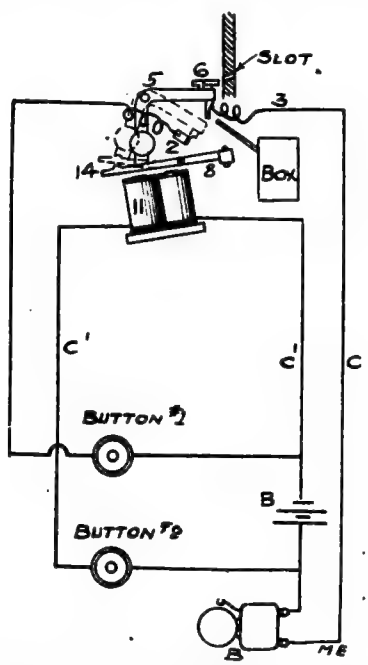
Vessel A has contacts Z, each of which are connected to different resistance coils, thus the mercury in A will change the interposed resistance on rising or falling. The three tubes A, B, C, all have mercury. The level of the mercury in C is controlled by air pressure coming from M regulated by cock H. The level can thus be controlled in A and the resistance as well. At J is a check device, which shows a difference of level between tubes P and R. The position of mercury in P and R always follows the changes in the level of A, and thus the operator has indications of the movement of the mercury at A, and the resistance being used. G is another cock to let out the air completely and let mercury lower if desired.

A FOOL PROOF DOOR BELL.

A device to prevent the unwarranted ringing of a Doctor's night bell is



set forth in the following drawing. A coin is inserted in the slot, and drops on the pan 6 of weighed lever 5. The lever 5 then tilts and closes the circuit at 2, but in so doing it engages itself in the catch 14 and cannot open the contact at 2. Thus the bell in the circuit is kept ringing at the will of the person touching button 1. Within the house, the button 2 is located, and by pressing same, the magnets 11 are operated which release the catch at 14 and return the apparatus to its previous condition. (Our Paris Correspondent does not state whether the coin is returned or whether it is an advanced fee on the payment for the trouble caused.)

ELECTRICALLY OPERATED CABLE CAR.

What is alleged to be the most novel cable road in Europe, is in use

for ascending the steep sides of Mt. Blanc in Switzerland. There are three sets of cables, the top one being used to hold the wheels of the hanging car, and support the greater part of the weight. Under this is another cable, which though smaller in size, serves the purpose in cases of emergencies for stopping the car through mechanical means. The bottom cable is moved by a set of drums at one end, operated by powerful electric motors. Thus the car is able to ascend or descend on the cable. This form of transportation is very inexpensive, as compared to the cost of building a railroad up the sides of a mountain.

AN ELECTRICAL AUTOMATIC DEVICE.

In the diagram herewith, we find a simple method of automatically switching from one lamp to another,

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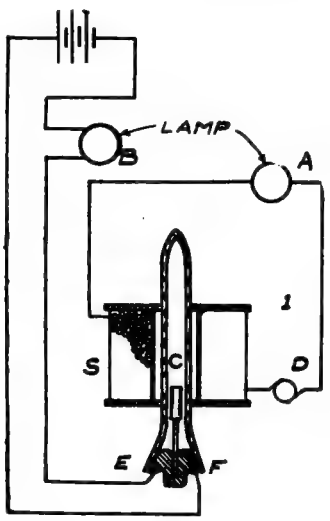
when the current on the first lamp is shut off through accident or intentionally.

Circuit 1 has the selenoid S the lamp A and the source of current or dynamo D. The selenoid under normal conditions when current is flowing through circuit 1, holds core C clear from the mercury below it. E and F are contacts, which are above and free from the mercury. However, should circuit 1 be opened, the core C will drop into the mercury, causing same to rise and connect E and F, which closes the circuit of the lamp B. Thus any breaks in circuit 1, will cause circuit



2 to be closed and the lamp B operated from the batteries or other source of current.

SPECIAL ZINC BATTERY ELEMENTS.

Great difficulty is experienced with the use of ordinary zinc elements in batteries, usually due to poor amalgamation. An English firm has perfected a special process and it is claimed that their zincs are free from encrustation and local action, that they ensure a full and constant supply of current, that they have almost double the life of ordinary zincs, that they require practically no attention, and judging from the reports made from many sources, these claims appear to be justified.

Of the many novel features figuring in these zincs, one of these is to have the lower portion of the zincs always heavier than the top, and tapering gradually. The reason for this

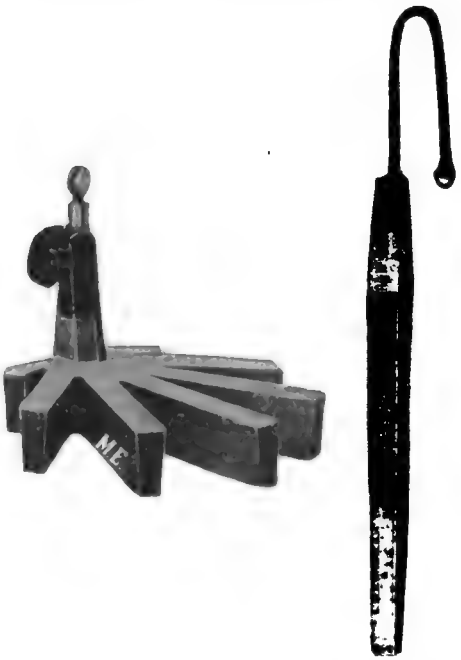


Fig. 1.

is said to be that zincs wear more rapidly on the bottom than at the top. In Fig. 1 is an illustration of a "Crowfoot" and a rod type of elements. Fig. 2 exhibits many types of zincs used in standard cells.

Fig. 2

These special zincs should prove a great boon to railroads and other institutions using many wet cells, for the economy will be far more appreciated in larger installations rather than in small ones.

Sympathy is like blond hair; a lot of it is not the real thing.

Google

THE ELECTRO-MAGNETIC GUN.

(Continued from page 489)

ing through the barrel is first subjected to a positive (or negative) magnetic influence and then to its opposite.

For example, if the initial magnetism be positive the projectile when subjected to the influence of a positive magnetism will assume at the end first presented a negative magnetism, while the opposite end will become a south pole. As the projectile advances through this particular section of the barrel, the projectile in approaching the opposite end of the section, presents to that end which possesses a negative magnetism, the end of the projectile which has just acquired a negative magnetism. The result is that there is a tendency of repulsion,—like poles repelling—which must be overcome before the stronger negative magnetism of the electro-magnet changes the magnetism at that end of the projectile to positive.

After referring to the objectionable features of construction and operation of previously patented electro-magnetic guns, Mr. Alderman, in the specification of his patent says:

"The foregoing objection is overcome in the present invention. By connecting two sections by a core and wrapping this core with the required coils, the two barrel sections become respectively the north and south poles of the magnet. This magnet, comprising two parallel and opposite sections and the connecting core, will of necessity have but two poles, depending upon the winding of the coil, and the two opposite poles will lie in the two opposite sections. It will thus be seen that by assembling a plurality of these magnets so that all the north poles will comprise one barrel and all the south poles, the other, an electro-magnetic gun is obtained in which a projectile during its passage through a barrel is subjected to the influence of but a single form of magnetism. The projectile, upon being introduced into the receiving end of a barrel, will acquire a magnetism opposite in kind to that of the receiving end, and as the barrel throughout its entire length is either entirely positive or entirely negative in its electro-magnetic energy, the projectile will at no time in its passage through the barrel be effected by a magnetism of the same kind as that acquired by itself."

Some years ago the Patent Office in reclassifying the various subjects of invention under "Class 172, Electricity-Motive Power" established a Sub-class for this particular class of invention, the latter now being under the heading of "Sub-class 285—Electro-Magnetic Guns."

In view of what has been accomplished in the last few years the prophecy of a practical electro-magnetic gun in the very near future is not believed to be unwarranted.

DR. BRANLY'S WIRELESS CONTROL SYSTEM.

(Continued from page 490)

be used by the enemy in case of war. Should the spark stream be quite continuous this would of course prevent any kind of distant control apparatus to be worked. It may happen, however, that the spark stream may cease for a short time, so that the operator has time to send out a signal and work the apparatus, such as firing a mine, for instance. We illustrate in Fig. 2, a device made by Dr. Branly for this purpose. It is placed at the far end and serves as a protector against a stream of sparks. Should these cease, even for a few minutes, the home operator has time to send a signal.

The apparatus contains a large disc D which is rotated by clockwork and at the same time winds up a weight P. The electromagnet B lifts up the disc and allows it to make one revolution, then it is dropped and the weight causes it to revolve backward. The action is such that under a constant stream of sparks the disc continues to rotate forwards and backwards in turn but without putting on the contact for working the control device, such as firing the mine. A second electromagnet C acts in connection with the apparatus, and the whole serves to bring into play a succession of mechanical movements and contacts which it would be outside of

(Continued on Page 594)

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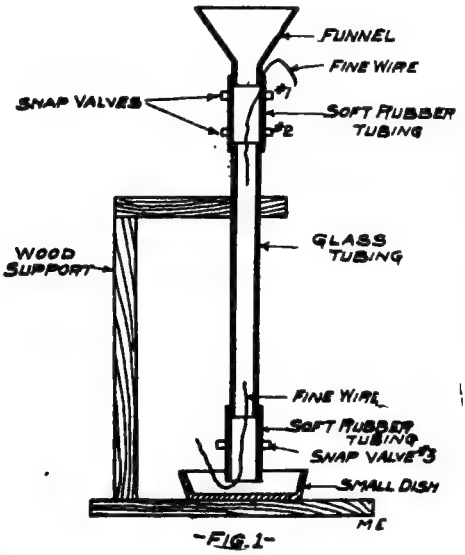
This department has been started with the idea to encourage the experimenter to bring out new ideas. Every reader is welcome to contribute to this department, and new ideas will be welcomed by the Editors. WHEN SENDING IN CONTRIBUTIONS IT IS NECESSARY THAT ONLY ONE SIDE OF THE SHEET IS USED. SKETCH MUST INVARIABLY BE ON A SEPARATE SHEET NOT IN THE TEXT. The description must be as short as possible. Good sketches are not required, as our art department will work out rough sketches submitted by contributors. IT IS THEREFORE NOT NECESSARY FOR CONTRIBUTORS TO SPEND MUCH TIME IN SKETCHING VARIOUS IDEAS. When sending contributions enclose return postage if manuscript is to be returned if not used. ALL CONTRIBUTIONS APPEARING IN THIS DEPARTMENT ARE PAID FOR ON PUBLICATION.

FIRST PRIZE TWO DOLLARS.

HOME MADE GEISSLER TUBES.

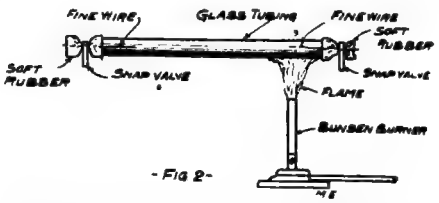
At the request from the editor for original articles, I will endeavor to describe the construction of Geissler tubes with simple apparatus.

Insert a piece of glass tubing between two soft rubber pieces as shown



-FIG. 1-

in Fig. 1. Also place a funnel at the top section, and a small dish under the bottom end. Then place snap valves in the rubber tubing all as illustrated in Fig. 1. A wooden stand may be used for holding the apparatus. Then pour mercury into the funnel, and after it is well filled, open snap No. 1, and after a few seconds, snap No. 2. Then the mercury will rush down the tube sucking and pushing all the air out of the tube. Snap No. 3 must then be closed, and a nearly per-



- Fig 2-

fect vacuum is obtained. Take off the funnel and bring the tube with the rubber hose ends and snaps to the flame of an alcohol lamp or Bunsen burner. By heating the tube gradually, the ends may be drawn apart, leaving the fine copper wire imbedded in the glass. By repeating this operation on the other end as well, a perfect Geissler tube is obtained, with the fine copper wires for connecting same to the spark coil.

Contributed by
HUSTED HEINRICH.

SECOND PRIZE ONE DOLLAR.

SELENIUM CELL.

With a reasonable amount of care in following the directions below, the average amateur can construct a good selenium cell, with which an unlimited number of experiments can be performed.

Obtain two glass tubes, approximating the dimensions in drawing. Wind on outside of smaller tube, two clean wires about No. 20 either tinned copper, brass, or hard drawn copper, in

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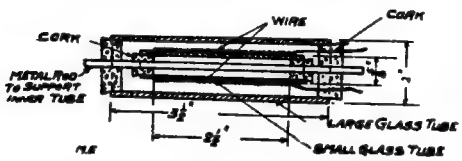
such a manner, that neither wire touches the other, throughout the entire length. This can be done by having two fine threads for insulation, and taping the ends to fasten threads, and wires.



Procure one-half ounce of stick selenium and lay it and the wound tube on a smooth stove plate, which can be heated with a Bunsen burner, lamp, or otherwise. Keep the tube rolling on hot plate, so it will not crack. When selenium melts smear over wires and thread, a *very thin* layer of melted selenium. If it becomes lumpy, raise temperature until it becomes a plastic semi-fluid. Do not raise temperature too high, as selenium will form drops like mercury, and drop off. When you have an even layer of selenium on wires, let the tube cool quickly, by rolling on a cool stove plate, until the selenium turns dull gray in color. Raise temperature again until just below the melting point, which can be determined by selenium starting to melt at the edges. Withdraw flame, so that it will not melt further, and turn down slightly, so that the temperature is just below the melting point. Keep cell at this temperature for an hour or so (the longer the better). Then let cell gradually cool for one hour by reducing flame gradually. This process is similar to annealing an iron core for an induction coil. Enclose cell in a larger tube to keep from moisture, and mount it to suit.

Contributed by

E. C. NASH.

COMMENTS.

In the Sept. issue of *Modern Electrics* I noticed an article on strengthening wireless signals by L. W. Davis. In reading it over I have come to the conclusion that he has a very poor wireless ground and when he connects in the line he of course gets a good ground and that is the reason why he does better work.

Also the article by R. Thompson on a grounding switch I don't believe that having the receiver anywhere near the antenna wire is good practice. A grounding device is used to protect the instruments from lightning. In his device, if the lightning came in I think it would have a fine time playing hop, skip and jump around his instruments as his telephone receiver is near the antenna wire.

In the article by J. B. Cowper on a hook-up for a switch, it will be noticed that when he is transmitting, his receiving aerial will ground the waves to a certain extent and therefore cut down his sending range. I think if a few of these amateurs would look over their articles they would see what foolishness some of it was and would not send in any more of the foolish ones, but would try and overcome that by some other apparatus, etc.

Contributed by

CHARLES L. WHITNEY.

A ROTARY SPARK GAP.

Procure a piece of hardwood 8x5x¾ inches to act as a base (H). Then screw a small battery motor (I) fairly well in the centre. Remove the pulley and place in its stead a zinc wheel (A) 1½ inches in diameter and ¼ inch thick. Make two brass or copper standards (C) and drill a ¼ inch hole near the end of each, so that it will take the metal rod (J). At the end of each rod place a piece of zinc (B)

FIG 2.

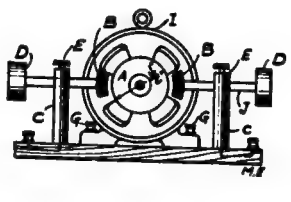


FIG. 1.

shaped like (Fig. 2). This zinc should be about ¾ inch long and ¼ inch wide. Two pieces of hard rubber (D), cut round may be placed at the other ends of the rods, so that it may be adjusted while working. A thumb screw (E), should be placed at the top of the standards to keep the rods (J) in place

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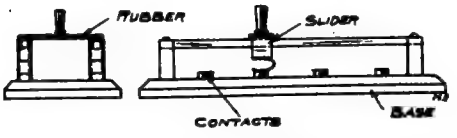
when once adjusted. Connect the two standards to binding posts (F).

Connect some batteries to the motor and your spark gap is ready for use as soon as you connect the binding posts (F) to your coil or transformer. This gap gives fairly good results even on ½ kw. transformers.

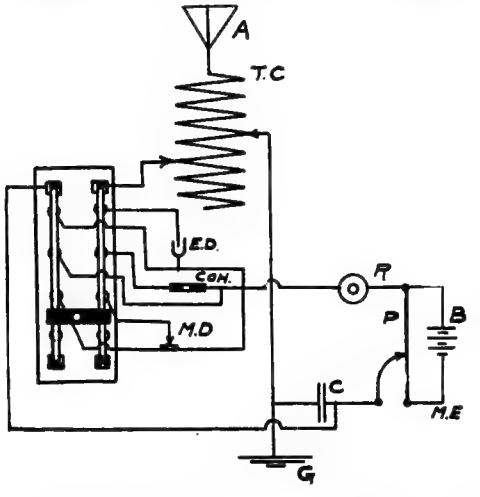
Contributed by
CHARLES S. STUCKEY.

A SLIDING SWITCH.

Here is an idea of a very useful switch. It is a double slider and multi-



point switch. As will be seen there are two binding posts making it possible to connect antenna and ground. By simply moving the handle backwards

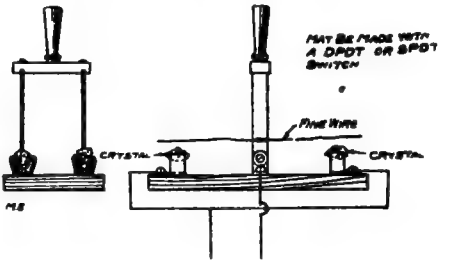


or forward you can switch the aerial and ground to any detector you wish.

Contributed by
GEO. PRESSEL.

A UNIQUE COMBINATION DETECTOR.

Here is a description of a very efficient and quickly changed detector: Take a S.P.D.T. knife switch and bend the contacts into the shape of a half circle to form the crystal cups, next solder a piece of very small silver plated piano wire about an inch from the bottom of the knife, then bend the wire so it clears the detector cups by a quarter of an inch when the blade of the switch is at right angles



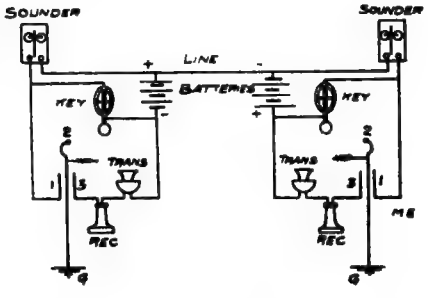
with the base. Using silicon with this detector, I have been able to get one-third longer range than with any other detector that I have ever come across. When sending, the blade should be in such a position that neither wire touches the crystals, in this way they will not be affected by the current.

Contributed by
K. JOHNSON.

SINGLE LINE TELEGRAPH AND TELEPHONE HOOK-UPS.

There are many readers of *Modern Electrics*, who have set up, and operated telegraph lines with nearby friends. Those who are good at reading the Morse code find it easy enough to converse quickly and accurately, but the majority are apt to be slow at receiving and they must find it tiresome and unsatisfactory in long conversations.

Thus there are occasions where a phone would be quicker and more useful. Fig. 1 shows the connections



for a combination telegraph and telephone set.

Two 75 ohms receivers and two transmitters are procured also the

mechanism of two receiver-hook switches, each having an upper and a lower contact, (ordinary two points switch will do if the hooks are not available). These can be mounted on a small box similar to the wall-type sets.

Method of connecting can be seen by referring to diagram. Care must be taken that the negative pole of the battery of one station conforms with the positive end of the other.

The set works as follows: When necessary to use the phone call on the key in the usual way. When the other end has answered, "FN" can be used as a signal to use the phone. Then the receivers are lifted off the grounded hooks No. 2 which, released by the spring will close on contacts No. 3, automatically connecting the batteries on talking circuit.

When the conversation is ended and the receivers are hung up, the hooks will rest on contacts No. 1, thus connecting the telegraph sets for use.

This system, despite the absence of the usual telephone induction coil, has been worked, by the writer, the distance of five city blocks with very good results, using 20 ohm sounders and six dry cells at each station. For greater distance it is advisable to use 75 ohm relays with a local sounder or buzzer circuit.

Contributed by

P. H. BOUCHERON.

HOW TO MAKE A STORAGE BATTERY.

From a plumbing house secure about 6 pounds of sheet lead. If this cannot be had, lead pipe which is used for drain-pipes under sinks will be suitable. If the lead pipe is used it should be split open in the center, and then made perfectly flat. From the sheet of lead cut 7 plates of the same size as shown in Fig. 1. These plates should now be placed in a vise, and filed smooth. After this bore each plate full of one-quarter inch holes. Also drill a hole in the lug of each plate to receive a binding post. Now make a thick paste of red lead and sulphuric acid, this paste being smeared into the holes in each plate, by means of a flat stick. The plates are placed on a smooth surface while pasting (such as a piece of glass, stone, etc.). After this the paste is allowed to become dry. After the plates are dry, lay one plate down and place a piece of one-quarter inch rubber at each end of the plate. Put the next on top of it. See that the lug on the second plate is on the opposite side from that on the first plate. Continue piling up the plates until all are in a neat pile. If they are piled correctly there should be 4 lugs on one side and 3 on the other. Now secure the plates together by means of heavy rubber bands. Now connect all the lugs together on one side, and all the others on the opposite side. Four of the plates are negative and three are positive. Set the plates in the jar you

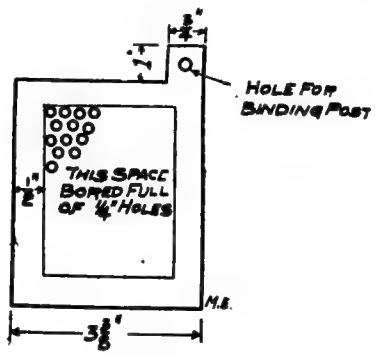


FIG. 1.

are going to use (I used a sal-ammoniac battery jar).

Strips of glass or rubber are placed in the bottom of the jar so as to prevent short circuiting the plates, by the small particles of paste that drop off the plates. Make a solution of 4 parts water and 1 part acid; fill the containing jar with this solution until it reaches about one-half inch from the top of the plates. Now pour melted wax over the top of the solution until it covers the tops of the plates, this preventing the acid from eating the binding posts and connecting wires. This battery can be made with a small number of plates if desired, but always use one more negative than positive plate. It can be charged from about 12 gravity batteries, or from the 110 volts D. C. by using 32 c.p. lamps as a resistance. It will run

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a 3 volt 1 ampere battery motor for 12 hours. It will take the following to make the battery: 1¼ pounds red lead, 6 pounds of lead, 1 pint of sulphuric acid (pure), 7 battery binding posts, ½ pound of wax.

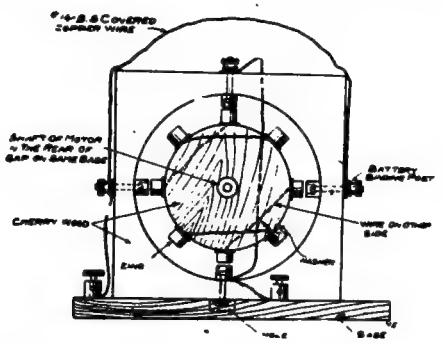
This battery is very cheaply made, compared with the service it will give.

Contributed by

H. W. H.

ANOTHER ROTARY GAP.

I have not noticed many "rotary's" in the Experimental Department of your magazine, and I have submitted this one, as being the highest and strongest pitch of any, to my knowledge. The more speed developed, the better it will work. I use this rotary myself with a Ritchie transformer and all of my wireless friends tell me it is as clear as



the Wellfleet station, that is of course to a certain distance, allowing for the power of my transformer. Before using this rotary, my spark was ragged, such as produced by a regular spark-gap which confused the reading of the other operator.

I have a very high speed motor and have geared the rotary gap fourteen to one with my motor running two thousand revolutions per minute, which gives me twenty-four thousand, after subtracting the approximate four thousand loss.

The idea of this rotary is that the spark is divided into four different parts which insures a higher pitch. The zinc used on the rotary is nothing more than common battery zincs cut up into pieces three-eighths of an inch long, and a hole in the center half-way through, so as to leave a margin of one-eighth of an inch on the outside surface, also a smaller hole in the center of that, all the way through for a screw to hold it on the wheel. The wood for the wheel and outside contacts can be secured at a mill very cheap. The remaining parts are simple, and can be made by anyone with a few tools.

The wheel may be belted or attached directly to the motor-shaft, though best results will be obtained by using the former method.

If this does not increase the clearness of your spark, let me know of your trouble through *Modern Electrics*, and I think I can advise you personally to advantage.

Contributed by

ELMER LEGGE.

TALKING THROUGH THE EARTH.

While erecting a telephone line from my house to a barn, about two hundred yards distant, I noticed that I did not have wire enough. I did not have a wireless outfit to use, so I decided to try old mother earth as my telephone line. One end of the wire I fastened to a pipe, driven about 1 foot into the ground, the other end, I fastened to a heavy piece of copper wire running to the bottom of a well near the house. I connected the other telephone at the barn the same way, and a distinct conversation could be carried on by using the two different soils of the earth.

Contributed by

STANLEY RADCLIFFE.

IMPROVED SILICON TICKER.

The following apparatus is an improvement on the ticker described by the writer on page 88, May issue of *Modern Electrics*. I have been waiting to see an improvement appear in *Modern Electrics* on this piece of apparatus but am disappointed; evidently not many experimenters having used it.

The improvement consists of soldering an inch or more spring phosphor bronze one-eighth of an inch wide to an ordinary Gillette safety razor blade which is very flexible and has sharp edges to make contact with the sili-

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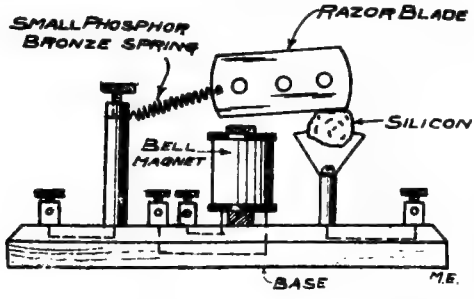
con. The blade should be about one-eighth of an inch above the bell magnet. It should rest gently on the silicon. The rest of the ticker is constructed the same as the first one described in the May issue.

The advantage in this form is that it is very much easier to adjust and holds its adjustment indefinitely. It can also be used to receive ordinary



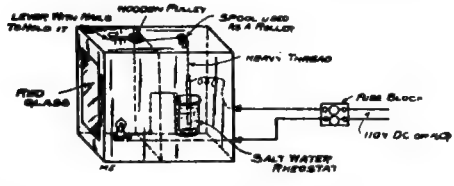
spark signals by simply cutting off the A. C. current. Using it this way it is very much better than a so-called "cat whisker detector." The Poulsen people have certainly "got one over" on the spark systems.

The station in this city keeps up unbroken communication with El Paso when the United Wireless and amateurs are sending within a few blocks' radius. They cannot hear spark stations unless they connect on an ordinary receiving outfit, which they sometimes use.

Contributed by
STANLEY E. HYDE.

AN ELECTRIC RUBY LAMP FOR THE DARK-ROOM.

The photographer who wishes to be up-to-date must of course, have an elec-



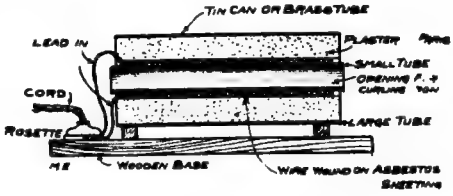
tric dark lamp. An efficient and handy one, which can be made bright or dim at will is easily constructed as follows: First procure a box 4x7x6 inches deep and nail a piece of wood 3 inches from the front, dividing the box into two sections. Screw to the bottom of the front section a red electric light globe, such as those from Xmas tree outfits. In the back, place the salt water reducer and connect to the current and to light. Run a thread out from the zinc over the spools to the pulley. Drive a few nails in at forty-five degrees to hold lever. It is best to give the glass a coat of red also for safety. The drawing explains the rest.

Contributed by
I. RUSSELL WILLISON.

AN ELECTRIC CURLING IRON HEATER.

Some time ago I was called upon to make an electric curling iron heater. I constructed the one I am about to describe and which has since given complete satisfaction.

The material required for the heater is: One ordinary rosette and wooden base to suit, a piece of brass or iron tubing ⅜x5 inches long, about one square foot of thin asbestos sheeting and 70 feet of 18 per cent. German sil-



ver wire, also a piece of brass tubing 1¾ inches in diameter by 4¼ inches long.

A piece of asbestos about 4 inches wide should be taken and wrapped around the piece of ⅜ inch tubing, leaving one-half inch of the tubing bare at each end. Around this the wire should be wrapped, putting a piece of asbestos between each layer. Two holes, "A" and "B" should be bored in the tubing, through which the leads should be passed. Care should be taken that they are well insulated from the bare tubing. The tube itself should then be pushed through the hole in the top of the rosette and the leads from the element attached to the binding screws inside. These are connected to the socket by a flexible cord and attachment plug. The lower half of the rosette should be screwed to the wooden sub-base and

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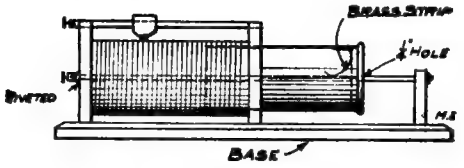
the upper half of the rosette fastened down with the usual lugs and screws. The large brass tubing should be slipped over the coil and secured in place with plaster of Paris. The curling iron is placed in the tubing and may be heated up inside of a minute or two.

Contributed by

ALEX POLSON.

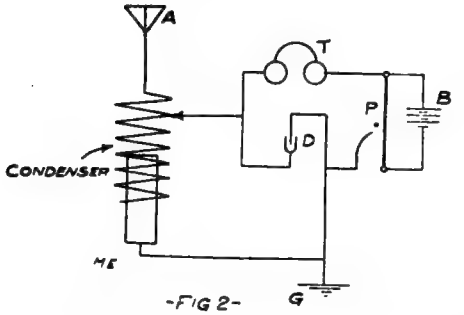
A NEW TYPE OF VARIABLE CONDENSER.

Here is a new kind of variable condenser which is very effective in cutting out static and high voltage line interference.



-FIG 1-

Materials required: One brass rod ¼x8 inches, 1 thin brass strip ¼x2½ inches, 1 slider to fit, 1 mailing tube 3x7½ inches, 1 brass mailing tube 2¾ x7 inches, 1 fibre end for small tube ½ inch thick, 2 block ends 4x4 inches, 1 base 5x16x½ inches, 1 brass tube 14 x¼ inches, 1 brass rod ⅜x1⅞ inches,



-FIG 2-

1 brass rod machine screw about 14-20 inch round head, ½ pound No. 18 bare copper wire.

Assemble the parts as shown in diagram. Connections are also shown in Fig. 2. A quarter inch hole is drilled in one of the binding posts to fit the tube.

Contributed by

LAWRENCE KREIDLER.

WIRELESS HINTS.

If the amateur has not the use of a lathe to turn a tuner core a light weight rolling pin after making both ends flat will come in handy.

The brass ends of empty Winchester No. 12 cartridges make handy detector cups for the experimenter.

A coil of fine fuse wire between the top of the metal rod and its connecting point on a Gernsback interrupter will make a fine safety fuse on a crowded wireless table.

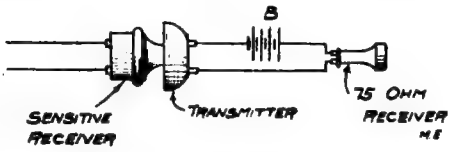
Contributed by

JOHN B. BRADY.

A SIMPLE SOUND INTENSIFIER AND RELAY.

A simple relay, which can be used as a sound intensifier or which will work a sounder or a Morse register, can be made with a sensitive wireless receiver and a transmitter.

When used as an intensifier the second receiver can be a 75 ohm one. The



first receiver must always be a sensitive wireless receiver. Fig. 1 shows the instrument used as an intensifier.

By replacing the receiver R, by a sounder or relay, one can hear the sound or work a Morse printing register, or any other such device.

While this instrument is very sensitive it does not get deranged, and need not be adjusted after it is made.

Contributed by

SAMUEL FROMME.

(Did Mr. Fromme try this? — Ed.)

AN EXPERIMENT IN THERMOPILES.

While experimenting today with a thermopile of my own make, I succeeded in generating a current with cold water, the experiment being as follows: an iron and copper rod welded together were connected in series with a D'Arsenval galvanometer. Upon heating the joint of the metals the galvanometer deflected to the right. Now

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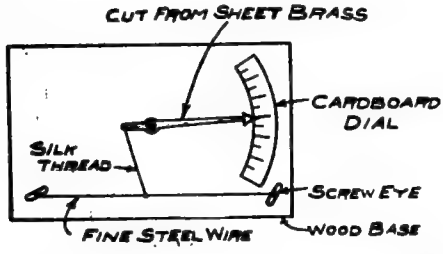
to see if sudden change in temperature effected the voltage, I plunged the thermopile in cold water. Instantly, a violent deflection took place and the pointer showed after it came to rest a deflection of 10 degrees. Now if cold generates electricity why can't electricity cause a low temperature in a thermopile? Working on this idea, I connected a 40 volt battery to the thermopile, but instead of getting cold it started to heat, so I tried a battery of lower voltage but with the same result. Here is a rough idea for some of our experimenters to work up to an electric refrigerator and save the expense and nuisance of ice for the household refrigerator. If electricity causes heat and heat generates electricity, and cold generates electricity, will electricity produce cold?

Contributed by
EDWARD W. HUTCHINSON.

ANOTHER SIMPLE HOT WIRE AMMETER.

I have tried to make several of the hot wire ammeters described in *Modern Electrics,* but always lacked some little part, so I designed one of my own, which is made of eight parts and, I believe, is simpler. It is screwed to the side of the wall and the weight of the hand operates it. Graduate the scale and tighten the screw-eyes until the pointer is at zero.



Contributed by
J. RUSSELL WILLISON.

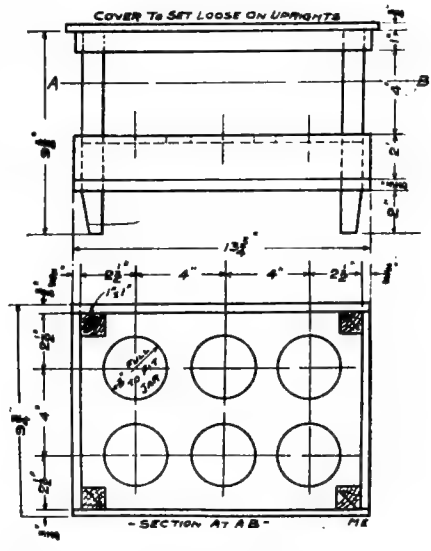
A NOVEL INSULATOR FOR INSTRUMENT BASE.

Procure four round glass stoppers from perfumery bottles all of the same size. Then bore four holes one in each corner on the bottom of your instrument base. The holes should be small enough that the stoppers may fit in tight. This makes your receiving set insulated from your sending and adds to the appearance of your station.

Contributed by
JOHN W. SALJGEBER.

A LEYDEN JAR RACK.

Here is a sketch explaining the making of an efficient and neat Leyden jar rack.



The diagram itself is explanatory I think, as I have tried to make it as clear as possible.

Contributed by
JOSEPH A. CORBALIS.

AN INTERESTING EXPERIMENT

In your last month's issue I noticed that you wanted different experiments, so here is one that worked fine with me. The materials needed are: A few test-tubes (about one-half inch in diameter and five or six inches long); these can be bought at any drug store for about 3 cents each and about 5 cents worth of each of the following: Sulphate of Magnesia (Epsom Salts) Sulphate of Soda, Sulphate of Copper, Sulphate of Iron and Bichromate of Potash; also a small alcohol lamp. Now put a little powdered Sulphate of Magnesia in the test tube (about one-half inch high in the tube) and enough water to cover it. Then boil over the alcohol lamp long enough to

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dissolve the salts. After it is dissolved pour into a saucer. Then do the same with the other salts. Each salt will crystallize separately and in groups, which, when all crystallized affords a very beautiful color.

Contributed by
LELAND A. REINHOLD.

RALPH 124C 41+.

(Continued from Page 500.)

search for clues alone without anyone to disturb him.

He looked into every nook and corner, but without results. He was already to give up when his eye caught the reflection of a light-ray falling on a bright object under the dresser.

Insignificant as the bright little metal object was, it was enough to freeze Ralph's blood in his veins. His technical knowledge had told him at once that the metal turning belonged to the balancer of the *Gyro-Gyrotor* of a *Space-Flyer*. Evidently the metal part had fallen down under the dresser and 60O 10 had not had the time to look further for it. Ralph reasoned that 60O 10 had obtained a supply of the parts which are only required if one thinks of undertaking a prolonged flight into space.

He knew now that Fernand 60O 10 had carried off his sweetheart in a space-flyer and that the machine by this time was probably far out from the earth's boundary, headed for unknown parts, where it would be practically impossible to follow without knowing the direction of the fleeing machine.

In a daze Ralph returned to his laboratory, where he immediately communicated with the central office. As all space-flyers must be licensed by law, he had little trouble in finding out that a brand new machine had been registered only four days ago. It had been acquired by a gentleman whose description coincided perfectly with 60O 10's appearance. The machine was built in Detroit, and the make was of course known. Ralph at once called Detroit and, while it was very late in the night, the manufacturer, as soon as he heard who the caller was, supplied him eagerly with all necessary details. He ascertained that the entire outside metal shell was of *Magnelium*—his own invention—and that this particular space-flyer was the first one to be equipped with the new metal. Ralph's joy had no bounds when he heard this, and terminating his call he shouted:

"Now it will be child's play! What luck! The only machine out in the Universe with Magnelium, my own Magnelium, of which I know more than any one living! Fernand, your time will be up shortly!"

(To be continued.)

A DIRECTIVE DEVICE.

(Continued from page 491)

direction from which the signals come.

Many interesting experiments may be tried, such as using either half of the aerial by closing either the E or the W switch, or throwing one of the S. P. D. T. switches to the ground while both E and W switches are closed, or you can use one-quarter, one-half, three-quarters, or all of the aerial by

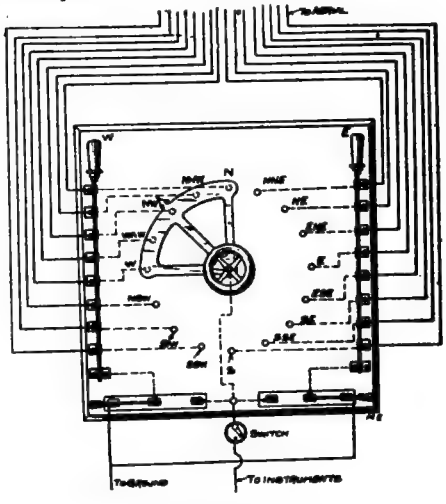

Fig. 3.

manipulation of the wheel and switches, making any number of combinations.

TRANS-ATLANTIC WIRELESS RATES.

In an agreement with the Canadian Government, the Marconi interests have offered to transmit all wireless messages between Canada and England, at the rate of ten cents a word. The submarine cables charge twenty-five cents a word for the same distance. All press business, weather reports, and appeals for help, will be transmitted at five cents per word.

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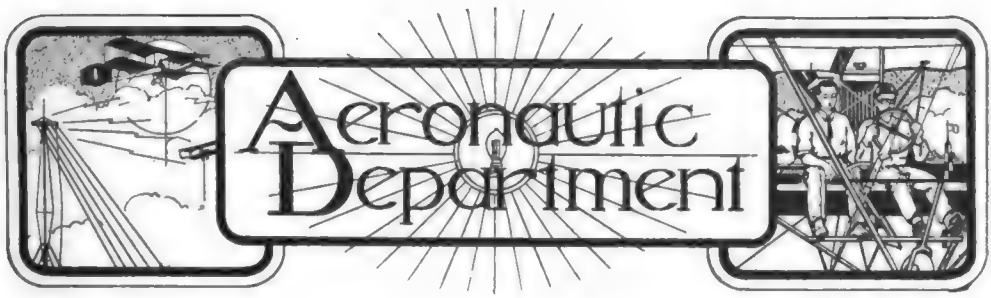


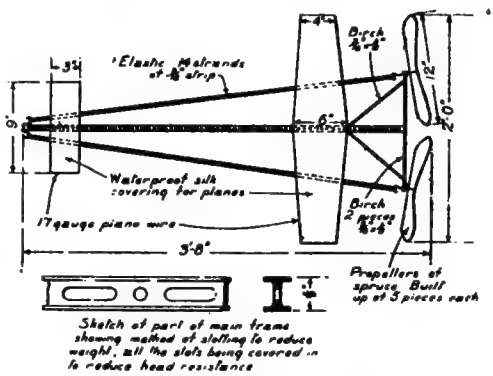
An Efficient Model Aeroplane

At the recent English contests for model aeroplanes, the monoplane of Mr. A. E. Cartlidge demonstrated remarkable qualities. While the entrant was not fortunate enough to secure the coveted prize, yet the stability and duration of the flights covered by this model caused popular enthusiasm. We have been fortunate in securing a drawing of this monoplane from the pages of "The Model Engineer and Electrician," which gives a few of the more important dimensions and details of this type.

The main stick should preferably be made of spruce, or other strong yet light wood. A slot should be cut the entire length, and a number of holes bored in succession to serve the purpose of reducing the weight. Care should be taken so that the holes do not reduce the strength of the stick beyond a reasonable limit. Thin strips of paper should now be pasted in the grooves so as to cover the holes in order to reduce the wind resistance which they would otherwise offer if left opened.

The small elevator plane as well as the main plane, are constructed of 17 gauge piano wire. Over this wire frame-work, a covering of waterproof silk should be placed and carefully fastened. For the best results, we strongly urge the use of prepared silks and fabrics which are sold especially for the purpose.

The propellers may be made from "blanks," which are blocks of wood roughly shaped. It is advisable to purchase the propellers ready made, for they always prove far more efficient than the ones made by the ordinary layman. In this model, it will be noted that there are two propellers, both turning in the opposite direction, as in the Wright Brothers bi-plane. Care must be taken when purchasing the propellers, that one is a left hand,


Elastic 14 strands of 1/8 strip
Waterproof silk covering for planes
17 gauge piano wire
3'-8"
Propellers of spruce. Built up of 3 pieces each
Sketch of part of main frame showing method of slotting to reduce weight, all the slots being covered in to reduce head resistance

The Cartlidge Monoplane.

while the other is a right hand propeller. Wooden ones are recommended, though either fibre or aluminum propellers give excellent results. A fine piece of steel wire should be passed through each propeller and a hook bent in the end so as to take the rubber strands. A glass bead of suitable size is placed between the propeller and the main framework, in order to reduce the friction.

The rubber band furnishing the motive power, is likewise an important factor. The British specifications call for 14 strands of three-sixteenths of an inch strip rubber, but the American standard is ⅛ inch stock. This would mean that 21 strands of ⅛ inch band should be employed, but in practice it will probably be found that less strands are necessary. Rubber band

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will last far longer if rubbed with talcum powder of the ordinary kind, before each flight. The powder keeps the rubber from drying, and therefore causes it to retain its elasticity.

We have given only the rough data, and leave the minor details to the tastes of the builder. We strongly disprove of using metal screws in the construction, for they rapidly add to the weight. All parts should be connected with fine wire or thread, with glue in profusion.

The correct adjustment of the parts make a satisfactory flight possible. The main plane should be bent upwards at the ends in the form of a bow. This can be done by pulling the both ends with fine threads or wires. The bearings of the propellers should be well oiled. When the model is ready for a trial flight, it should be held in one hand by its main stick. The other hand should hold the two propellers which have previously been wound. Then the propellers should be freed and after they have revolved a few times, the model is given a slight push forward and released. By the proper manipulation of the wings after each flight, the experimenter will finally succeed in obtaining splendid results. As for the winding, the propellers should be turned in the proper direction, so that upon being released, they will throw the wind. The turns should be counted, and after the strands have formed into one row of knots the entire length, just wind that number of turns again. This is the maximum winding required. A rudder is unnecessary in this model, for the propellers turning in the opposite directions, keep the monoplane in a straight course.

THE CENSUS OF AEROPLANES.

The "Daily Mail" has made an interesting investigation into the number of aviators and machines in use today, and according to their report of September 15th, 1911, it is officially stated that there are 501 recognized and licensed pilots. This figure may seem insignificant, but when we remember that at the end of 1908 there were but four men who could fly in heavier-than-air machines, namely, the two Wrights, Henri Farman, and Santos-Dumont, the figures draw our interest. Last March, there were but 200 aviators, and since then the remarkable increase has likewise been followed with a number of different types of aeroplanes. Among the most important of their respective classes are:—

Bi-planes: Voisin, H. Farman, McCurdy, Vendome, Wright, M. Farman, Curtiss, Goupy, Siemens, Sommer, Breguet, Gobron, and Savary.

Monoplanes: Bleriot, Nieuport, Tellier, Peugeot, Wernher, Antoinette, R.E.P., Mongolfier, Saulnier, Demoiselle, Grade, Train, Puetzner, Hanriot, Koechlin, Gyp, and Euler.

Tri-planes: Roe.

AEROPLANES IN WARFARE.

From various reports, it is understood that Italy has prepared an aerial fleet of twelve aeroplanes and two dirigibles. These are equipped with trained aviators. The intention of the Italian officers is to attack the camps of the scattered Turks around Tripoli, dropping bombs into their midst. A special design in bombs has been prepared, and each aeroplane will carry a number of these missives capable of spreading great disaster. The outcome is interesting, inasmuch as it is the first actual demonstration of aeroplanes in warfare.

A MODEL AERODROME.

M. Brianne, a French aviation enthusiast, has built a model aerodrome, for flying miniature machines. The field is but 12 feet square.

Models are used, on which a light electric motor of special construction has been installed. Power is fed from a center point on the field, by means of flexible wires, and the models are caused to fly in a wide circle. The machines being equipped with wheels, are first noticed standing still. When the current is turned on the propeller begins to revolve, and after obtaining sufficient speed, the aeroplane begins to gather speed rolling along the ground. When sufficient velocity has been reached, the model slides into the air, much like the larger machines. The tests are very realistic even

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though the element of human danger is absent.

While the readers may consider this aerodrome a plaything, it is a scientific testing ground. All inventors having novel ideas are urged to build a small model, according to their plans, and the small electric motors are then placed on the model to be tested. The expense saved in not having to build a large model is obvious at a glance. Conditions exactly analogous to real aeroplane flights can thus be obtained.

M. Brianne has tried interesting experiments with the body of a crow, which had been remounted on a suitable frame work. A motor was installed with a strength of 1-20 h.p. and very satisfactory flights made.

THE NEW WRIGHT GLIDER.

When interviewed recently, Orville Wright stated that he was going to Kitty Hawk, N. C., for a vacation. According to the reports appearing in the daily press, it is more than evident that the Wrights have gone to that desert region for a series of experiments, similar to those which they conducted during 1903 while perfecting their world famous bi-plane.

WIRELESS TELEGRAPHY ON THE FRENCH DIRIGIBLES.

For the first time in France, at the great manoeuvres of Picardie, a dirigible was equipped with apparatus for wireless communication. Similar experiments had previously been tried by the German officials in 1909, through the use of apparatus weighing several hundred kilograms, the German dirigible of the Parseval type having negotiated a distance of 50 kilometers with her equipment. The French were not slow to appreciate the superiority of the German airships thus equipped, and under the flaying of their own press, proceeded with lengthy experiments to produce a satisfactory wireless set.

The complete apparatus installed on the Clement-Bayard dirigible, weighs but 60 kilograms (approximately 132 pounds), and during the tests, despatches were exchanged with ease at 100 kilometers. The installation of a receiving outfit on an airship presents little if any difficulty. However, the receiving set is of little value to the crew, for it's naturally the power to send and advise the commander at a distant point relative to the observations, that is of greatest use. The receiving of instructions from the distant home station is of secondary consideration.

The installation of a wireless set on a dirigible presents many problems which must be solved. Danger from explosion of the hydrogen gas in the

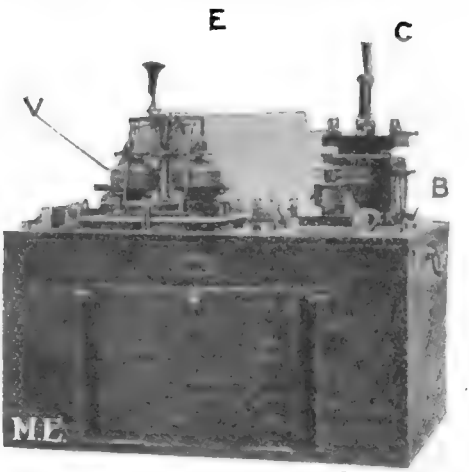

Fig. 1. General View of Sender.

silk bag is also imminent from the sparks of the set. The barriers thus confronted, have fortunately been overcome by the Commandant Ferrié, the head of the French wireless operators of the Army Corps.

The first requirements for the sets, were, that they should be of such construction and compactness, as to enable their being placed on any dirigible immediately. This definitely limited the motive power to special storage cells of light construction. On the Clement-Bayard airship, 10 storage cells were employed, giving a current of 20 volts and a safe drawing load of 5 amperes. A special transformer was next considered to raise the potential of the batteries to a suitable current for transmission. The drawback of having to limit the secondary voltage to prevent dangerous sparks, was also a serious difficulty, but was overcome by using a higher speed vibrator in the primary circuit, thereby obtaining more sparks, more

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current, and yet lessening the danger of using higher voltages. By overcoming this difficulty, a great advantage was acquired, and that is the production of a musical spark, the properties of same for long distance work being recognized. It was found that a frequency of at least 250 to 300 interruptions in the primary circuit per second would be necessary. The fastest interrupters in general use did not exceed 100 interruptions per second, which caused the inventing of one using an entirely new principle.

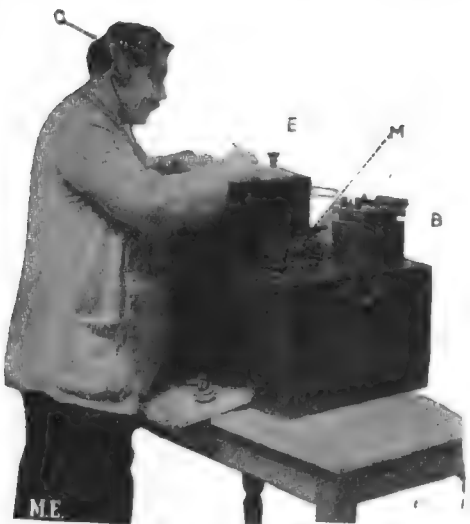

Fig. 2 Operator Working Set.

All contact points and spark gaps were carefully covered with metal screening, similar to that used on miners' safety lamps.

The apparatus tried on the Clement-Bayard, completely overcame these complicated difficulties, and in fact over-reached the expectations of the designers. In Fig. 1, we have a reproduction of the set used, in which the special high speed interrupter is noticeable at V. This interrupter is the joint invention of Engineer J. Bethenod, and Commandant Ferrié. By having the interrupter working at a frequency of 500 interruptions per second, it is possible to use a transformer of a very compact type as shown at B. The apparatus in this cut is shown with covers removed. C is the aerial switch for throwing in either the receiving or transmitting sets. E is the spark gap. In Fig. 2, the operator is working the set. M is the oil break key, and C the head receivers. The cover is in place for protecting the interrupter, and the necessary knobs protruding through same permit the operator to make the necessary adjustments. The key as just stated, breaks in a tank of oil, and therefore the possibility of a spark is entirely overcome.

The application of wireless telegraphy to dirigibles has convinced the French government that this type of airship constitutes a valuable engine of war. It is possible with its use, to obtain important information regarding the relative strength of the enemy, the fortifications, batteries, movements, and other necessary details for a successful assault. The possibility of a dirigible hovering over the enemy for lengthened periods with engines stopped, is an excellent point unfortunately lacking in aeroplanes. While the expenses of building a dirigible far exceed that of an aeroplane (it is said that 25 aeroplanes can be bought for the cost of one dirigible) the maintenance of same is on par with that of one aeroplane. The excessive breakage of aeroplanes makes them expensive weapons of warfare. Then again, it must be remembered that in aeroplane engines where everything is sacrificed for weight, the life is seldom in excess of 150 hours of total operation.

It is difficult to predict which type of airship will be adopted, but a conservative prediction would be that the airships will be used for bomb dropping and attacking, while the aeroplanes will be used for scouting and attacking the airships, much the same as the torpedo boats and the dreadnoughts.

How proud we are of things we intend to do!

A man's relations seldom bother him if he is poorer than they are.

If you don't think well of your employer keep your thoughts to yourself.

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Wireless Telegraph Contest

Our Wireless Station and our Laboratory Contest will be continued every month until further notice. The best photograph for each contest is awarded a monthly prize of Three (3) Dollars. If you have a good, clear photograph send it at once; you are doing yourself an injustice if you don't. If you have a wireless station or laboratory (no matter how small) have a photograph taken of it by all means. Photographs not used will be returned in 30 days.

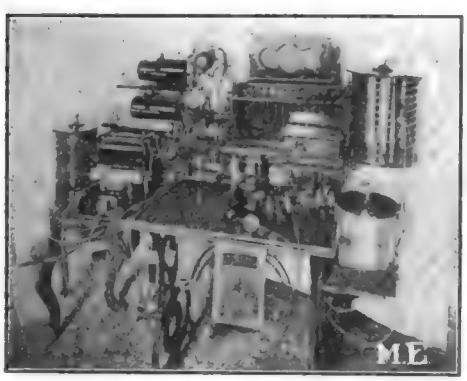
PLEASE NOTE THAT THE DESCRIPTION OF THE STATION MUST NOT BE LONGER THAN 250 WORDS, AND THAT IT IS ESSENTIAL THAT ONLY ONE SIDE OF THE SHEET IS WRITTEN UPON. SHEET MUST BE TYPEWRITTEN OR WRITTEN BY PEN. DO NOT USE PENCIL. NO DESCRIPTION WILL BE ENTERED IN THE CONTEST UNLESS THESE RULES ARE CLOSELY ADHERED TO.

It is also advisable to send two prints of the photograph (one toned dark and one light) so we can have the choice of the one best suited for reproduction.

This competition is open freely to all who may desire to compete, without charge or consideration of any kind. Prospective contestants need not be subscribers for (the publication) in order to be entitled to compete for the prizes offered.

FIRST PRIZE THREE DOLLARS.

ENCLOSED please find photo of my wireless telegraph station, with which I am having fine and perfect success in picking up the Pacific Coast stations every night. "P.J." Los Angeles, "P.I." Avalon, "N.P.H." Mare Island, "N.C.Z." U.S.S. California, and "R.U." Port Arthur, Texas, coming in clear and very loud. Also



hear "G.O." Chicago, "N.A.R." Key West, "R.H." Santa Rosalia, (Mexico), and over thirty other commercial land stations and steamers on the Pacific Coast, loud enough so that I have no trouble in copying their messages, and have heard "T.T.Y." Tenyo Maru, working with "P.H." San Francisco, after they were twelve hours out on their way to Hong Kong. With this station I received the first message from "P.J." Los Angeles, that was ever sent across the Rockies to be delivered here in Denver.

For receiving I have two separate sets, so that either the tuner or loose coupler can be thrown in, consisting of 2 loose couplers, 2 variable condensers, 2 fixed condensers, 3 detectors, 1 tuner, and 2 sets of receivers of 2,000 and 3,200 ohms. Use a 10 inch spark coil for sending and a plate glass variable condenser with switches to vary same from 1 to 12 plates. My aerial switch shorts the detectors while sending and opens the 110 A.C. circuit when in position for receiving. With the exception of phones and key, all of the instruments were hand made by me and highly finished in dark walnut.

Am using a 12 wire No. 12 aluminum loop aerial 120 feet long with wires spaced three feet, one end 90 feet high, other end 60 feet high.

I have received every copy of *Modern Electrics* for the past two years, and consider it the best magazine published on wireless information.

W. H. SMITH,
Colorado.

HONORABLE MENTION.

I am enclosing herewith a flash-light photo of my wireless telegraph station.

Sending outfit consists of E. I. Co. 2 inch coil, Caldwell interrupter, two Leyden jar condensers, helix compos-

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ed of 15 turns of No. 8 copper wire wound on frame made of eight porcelain tubes through wood end pieces, ring style anchor gap, rubber mounted zinc spark gap and Morse key with heavy German silver contacts. I also have the use of a 2 kw. closed core transformer with which I have been

making some tests for long distance sending, but use a 2 inch coil for all local work. I communicate regularly with a friend living at Albany, N. Y.,

with this coil, and also friends living at Schenectady, N. Y.

Receiving set consists of loose coupler tuner, inductance, loading coil, fixed condenser, potentiometer, perikon and silicon detectors, two pairs of 3,500 ohm phones, (second pair for visitors to listen in by switching in series) and the batteries on shelf used for local line telegraph and buzzer test. I use an omnigraph for wireless practice in series with buzzer. I use a 4 wire loop antenna 125 feet long made of No. 14 copper wire on 12 foot spreaders.

My station is located on a hill 200 feet above the level of the Mohawk River. Here I have a mast 123 feet high made from spliced pine poles (3 pieces). I have heard as far down as Charleston, S. C., and get M.C.C. with more than ordinary loudness considering the distance.

I am a constant reader of your valuable magazine being greatly interested in the amateur contests.

L. E. SMITH,
New York.

HONORABLE MENTION.

The enclosed photo represents the result of the writer's efforts in the study of wireless telegraphy.

Beginning actual work less than a year ago, I have added to my equipment until at present it includes the following apparatus.

Receiving.—2,000 meter loose coupler, fixed condenser, silicon detector—remodeled from electrolytic, variable condenser—31 plate, 2,000 ohm "Electro" Am. phones, and test buzzer.

Sending.—One inch spark coil, zinc spark gap, helix—wound with 6 turns No. 6 aluminum wire, glass plate sending condenser, key, D.P.D.T. switch, with D.P.S.T. switch connected to outside ground.

A four wire aerial, composed of two aluminum and two copper wires connected "loop" style, 100 feet between spreaders, on fifty foot masts, with 75 foot single copper lead-in, completes my outfit.

All instruments, except phones, coil and key, were designed and constructed by me.

I have had great results from the above outfit being able to read C.C., H.A., B.S., C.B., C.X., and most of the Atlantic coast stations as far south as Savannah, Ga.

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While not a subscriber to *Modern Electrics* I have never failed to purchase a copy of same since entering this fascinating branch of electricity and, needless to say, most of the above

apparatus was designed and built through valuable information obtained from your excellent magazine.

New York. W. H. STEVENS,

HONORABLE MENTION.

Enclosed please find photo of my wireless outfit. All of the apparatus for sending and receiving, with the exception of the spark coil, key, fixed condenser and receivers, I have made myself.

The sending set is comprised of helix, glass plate condenser, Leyden jar, one-inch spark coil and spark gap. For receiving I have 2,000 ohm receivers, galena detector, double-slide tuning coil and a three section fixed condenser. I also have a D. P. D. T. switch, double fuse and lightning switch, and buzzer test.

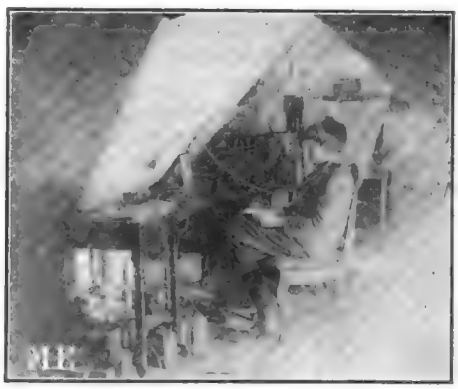
My aerial is made of two 7-strand copper wires placed 30 inches apart, 50 feet high and 100 feet long. I formerly had four wires but experience has taught me that two wires will give a result equal to any other number and avoids the annoyance of getting twisted together.

The results are all that an amateur could wish for. When the detector contact is good, the receiving is as clear and distinct as an ordinary telegraph heard in a station, and can be as easily read by those familiar with the code.

I receive each evening from the N. Y. "Herald," the baseball scores, prize fights, and each noon the time from the Brooklyn Navy Yard. I do not know just how far I can receive but have reason to think that it is a long distance. My sending is limited to a few miles owing to the lack of power. I practise the code and am learning a little each day, hoping soon to get more pleasure from my work.

I have just enjoyed my 15th birthday, but have had my "wireless" working for six months past. I have found many helps in *Modern Electrics,* which I keep in file and would not miss them for anything.

In addition to above outfit I have a K. & D. generator, Red Devil Water Motor, omnigraph, pair of "Stay Right" telephones, electric engines,



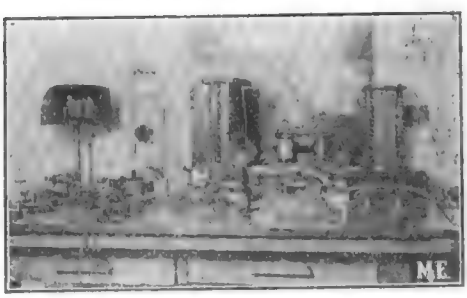
motors, telegraph instruments, Geissler tubes, etc.

PERCY T. HAESELBARTH,
New York.

HONORABLE MENTION.

This station is mostly of my own construction, located in my room.

The sending set consists of a one-



inch spark coil, a helix composed of 15 turns of No. 8 copper wire, two Leyden jars, with a zinc spark gap mounted on top.

For receiving I use an electrolytic detector for long distance work, and two silicon and one perikon detectors.

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I also have a Marconi detector of my own make, situated under the table which gives fine results. I use a double slide tuner, two fixed condensers, potentiometer, milli-ampmeter and a pair of Holtzer Cabot 2,000 ohm phones (not shown in picture). I also have a coherer and bell used for calling.

The other apparatus shown in picture is a private telegraph and telephone which I have connected with several boys in the neighborhood. I have two tops on the table, which was especially constructed for my wireless, so that I can conceal all wiring.

The aerial is straightway consisting of 4 aluminum wires 40 feet high and 110 feet long.

I find *Modern Electrics* a great help and have constructed most of my apparatus by its directions.

West Virginia. FRANK L. TYREE.

HONORABLE MENTION.

In the accompanying photograph will be noticed the complete wireless apparatus which I have in my wireless station.

The receiving set is composed of a double slide tuner, fixed and variable condensers, peroxide of lead detector, universal detector, and a potentiometer. I also use a home-made galena detector with excellent results. The receiving set is located to the left of the picture.

The transmitting set is composed of a Clapp Eastham one-quarter kw. closed core transformer, worked from current obtained from a small rotary converter of the "Eck" type. This is placed under the table in an asbestos lined box, and mounted on a soft rubber base to completely destroy the sound. The secondary circuit is brought to a large condenser located under the table, and to the spark gap and helix which are plainly noticeable over the table. I use a helix of the loose-coupled inductive type described in the December, 1910, number of *Modern Electrics*. By having an additional coil with a slider located in the aerial, I am able to still increase the wave length. The switchboard gives complete control of the entire apparatus.

The aerial is composed of two phosphor bronze wires, 150 feet long and 80 feet high. The wires are spaced 10 feet apart. The entire aerial system is

well insulated, and a suitable lead to the ground of No. 4 wire, is used for the grounding of same during lightning storms.

REV. ALBERT A. BRADFORD,
New York.

DR. BRANLY'S WIRELESS CONTROL SYSTEM.

(Continued from Page 507)

our present limits to describe in detail. When the home operator sees that the stream of sparks has stopped, he makes the needed signal by first sending a short stream of sparks to set the apparatus and then sends a single spark, and this acts to fire the mine. He sees the right moment for doing this by observing the back signals which he receives on a continuous paper strip, as we already mentioned. Dr. Branly is engaged in simplifying the device, and we expect to give a more detailed description of it in its new form. We also illustrate an automatic device Fig. 3 for sending out distant control signals from a post without needing to have an operator stationed there.

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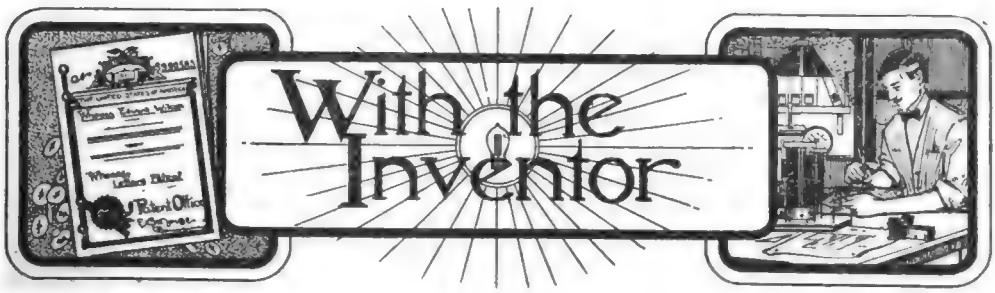


Patent No. 1,005,786, has been granted to Mr. John Schade, of Brooklyn, N. Y., on Spring Binding Posts.

This invention relates to improvements in spring fastening devices for electrical conductors, and the objects of the invention are to enable the conductor to be firmly gripped and maintained in defined position in the device, to cheapen the cost of manufacture and enable the devices to be made out of sheet metal and to provide a construction wherein the conductor may be inserted longitudinally into the device and maintained in position.

There are many circumstances in which it is desirable to use a fastening device in which the conductor is inserted longitudinally instead of transversely, and my device accomplishes this object as well as other objects which will hereinafter appear.

Figure 1 is a perspective view of a device embodying the invention; and Fig. 2 is a similar view of a modification with the wire inserted.

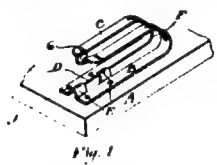


Fig. 1

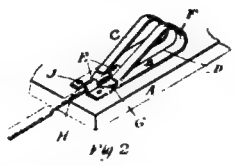


Fig 2

The fastening device is adapted to be secured to a base or support A and in this instance the device is shown secured flat upon the support, although other means of supporting the device may be provided as desired, according to the nature of the work for which the device is used.

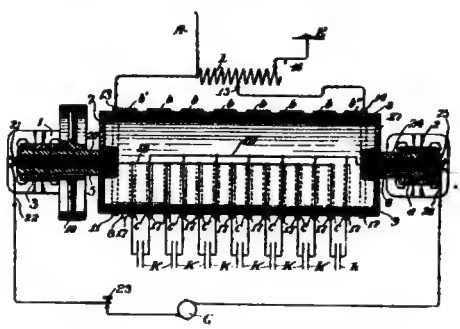
In Fig. 1, the device comprises a single piece of metal, although I am not to be understood as limiting the invention in this respect, for each device may comprise as many separate parts suitably secured together, as may be desired.

In Fig. 1, B represents the body member and C the spring member which is bent over the body member and is normally separated therefrom. The body member is bent longitudinally of its length to form an arch or rib and this rib is slotted transversely at D, leaving two upwardly projecting resistant portions E. The remainder of the body and spring members is preferably slotted longitudinally at F and the outer end of the spring member is provided with the wire engaging loop or bend G, which is pressed out of the metal and is adapted to pass into the slot D between the projecting members E, so that when a wire H is inserted longitudinally beneath the members E and through the wire engaging portion G, said wire will be gripped at at least three points of contact in the same plane and held in position by the retractive force of the spring.

The device is adapted to be secured to the support A as by means of the screws J.

As the illustration shows, the new binding post is an extremely simple device, and at the same time it is a very good idea. Usually the simple things are the best ones and most of the time they are far ahead of the more complicated ones. A good point about this binding post is that it gives large contacting surface. An extract of the specification is given above.

Mr. Harry Shoemaker, of Jersey City, N. J., has obtained Letters Patent No. 1,005,338. This is a new wireless transmitting apparatus and the following is part of specification:



It is the object of my invention to provide powerful transmitting apparatus to the end that communication may be established over very great distances. For this purpose a condenser or battery of condensers is employed, the condenser or condensers being discharged through a circuit or winding either inductively or conductively associated with a radiating circuit, conductor, or conductors, without the intervention of the

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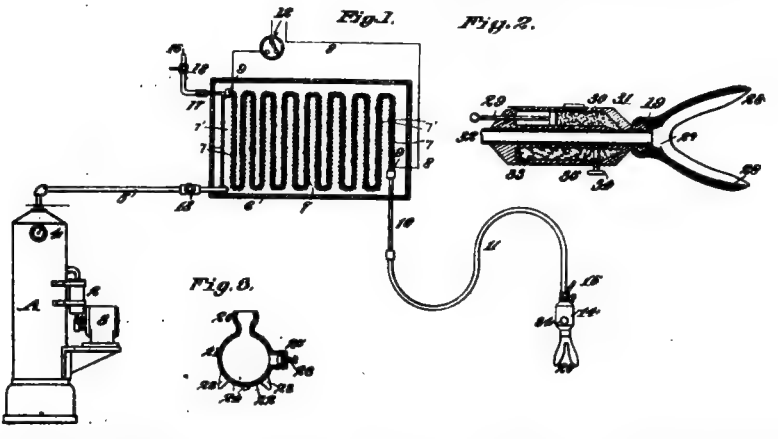
usual spark gap heretofore employed in wireless signaling systems.

It is a feature of my invention that the high frequency oscillations are produced in a conductor or circuit having no spark gap.

It is a further object of my invention to provide transmitting apparatus which is substantially noiseless as compared with transmitting apparatus heretofore employed. As is well understood in this art, the transmitters heretofore known for high frequency oscillations have employed spark gaps. The sparking at such spark gaps is always accompanied with more or less noise, and in high power or long distance transmitters such noise amounts to crashes, necessitating the spark gap being isolated in separate buildings in some cases. The sparking is particularly objectionable in confined operating rooms, especially on shipboard. By my invention herein disclosed such noises and crashes are avoided.

This idea which is quite novel should prove of interest to our readers as Mr. Harry Shoemaker is a wireless inventor of note.

Mr. William J. Citron of San Francisco, Cal., has been granted patent No. 1,004,849, on a Tonsorial Apparatus. Part of the specification reads as follows:



The object of the present invention is to provide a compact, simple and convenient device, whereby tonsorial artists and others may apply lather to the face of a person and also to provide means whereby the face may be dried and powdered; to provide in combination, an apparatus whereby either warm air, steam or heated water may be delivered into contact with the face of a person, and to provide means whereby air under suitable pressure may be impregnated with water or other fluid, and means for heating the air or water, or for generating steam, as desired.

A further object is to provide in combination with a suitable apparatus for supplying fluid under pressure, means for intermixing with the fluid either powder or perfumery or both.

In order to enable the operator to lather the face of a person, the outer end of the massage head 14 is formed with a shoulder or annulus 19 to receive the socket 20 of a substantially globular rubber pouch 21, which may be provided with a surface 22 provided with a number of resilient projections 23 and interspersed between the projections are passages or perforations 24 communicating with the hollow interior of the pouch 21. Upon one side of the pouch is formed a projection 25 provided with a small valve 26 adapted to open inwardly. The operator compresses the pouch 21 and dips the projection 25 into soft soap, and releasing the pouch, the consequent expansion of the same causes a small quantity of the soap material to be sucked into the cavity of the pouch and retained. Then, by turning on the valve 15 and operating the valve 18, a spray of liquid or fluid is discharged into the pouch 21 which, mixing with the soft soap in the cavity, discharges the same through the perforations 24. If the operator desires to use heated air or water in discharging the soft soap, he has then to turn on the electric switch 12, thus heating the contents of the heating unit 7. While the contents of the pouch 21 are being ejected through the perforations 24, the tonsorial operator proceeds to "rub up" the face or beard with the projections 23 making a perfect mixture and good lather; at no time being required to use his hands in direct contact with the face of the person being treated This operation having been finished, the operator quickly detaches the lathering pouch 21 from the massage head 14 and proceeds with the usual shaving or other operations, following which he quickly applies to the shoulder 19 of the massage head a soft pliable massage member 27 having palmlike leaves 28 adapted to be applied upon the cheeks of the person being massaged. The operator then gently closes the massage palms 28 upon the face of the patient and turning on the air valve 5 and the current switch 12 gently blows a warm drying blast of air upon the face.

This invention is quite original in

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some of its parts, and we believe there is a future for this device as in the first place it is more hygienic; secondly, the feature of drying the face by means of hot air instead of the ordinary towel, will appeal to the man who has to be shaved often and who has a tender skin.

By making a few minor improvements on the mixing chamber and improvements on the part 29, we believe the apparatus will be bettered considerably.

Now that Mr. Citron has invented a good tonsorial apparatus, might we suggest to him that the same apparatus could perhaps also be used to blacken and polish shoes?!

Mr. Frank M. Euler of Elizabeth, N. J., has been granted patent No. 1,004,002, on an adjustable electric lamp. Part of specification is reproduced herewith:

This invention relates to a new and improved adjustable and quick-detachable incandescent lamp.

While there are now on the market and in common use many devices for adjusting incandescent lamps to obtain either a closer or a less intense application of the rays of light therefrom, these generally are limited to adjustment of the stand or bracket for the lamp, and in certain cases are found to be inconvenient, and thus do not give the best results desired.

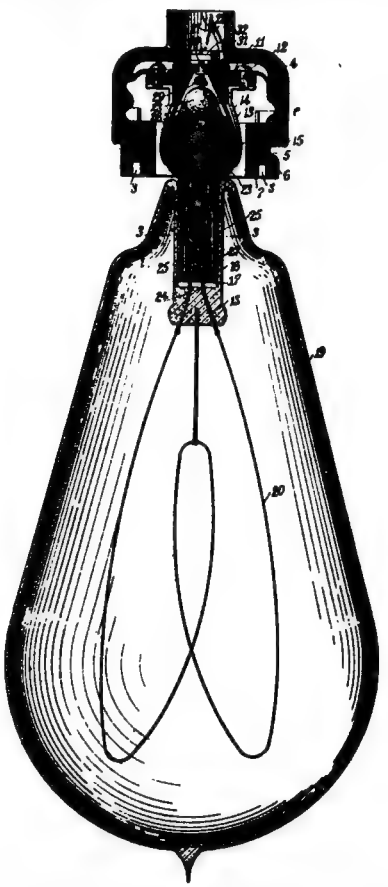
An object, therefore, of this invention is to provide a new and improved lamp of any suitable type, such as an incandescent lamp, in which the lamp proper, and in this case the bulb, is adjustable to a plurality of angles, whereby the light may be directed to any desired point.

A further object of this invention is to provide a lamp in which the bulb or lamp proper can be quickly detached without the necessity of unscrewing the plug, which is usually necessary in such types of lamps as are now found on the market.

A still further object of this invention is to provide a lamp which is detachable from its plug, the plug being adapted to be normally locked in the usual socket, but capable of being detached therefrom, if desired, in extreme cases.

This idea is a really good one if the thin neck of the lamp is improved by strengthening it in some manner. This to us, is the only defect now, and we believe it can be overcome; the idea which is really quite ingenious, should prove of interest to our great lamp concerns, as, doubtless there will be a large demand for an electric lamp bulb that can be adjusted to any reasonable angle so as to better direct the light on the work.

Eight claims have been allowed to Mr. Euler on this patent and we believe that if he will push his invention



vigorously the lamp might in time be used as a standard, the same as the Edison Screw Base is to-day standard the World over.

Mr. Levi M Neher, of Milford, Ind., has obtained Letters Patent No. 1,005,283 on Spring Binding Posts. The following is part of specification and the illustrations are self-explanatory:

In the drawings Figures 1 and 2 are perspective views of a simple form embodying the essential features of the invention. Fig. 3 is a perspective view of a modification in design.

The binding post consists of a metal punching bent upon itself near the middle to form opposing flat surfaces 1 and 2 each of which is formed to co-operate with the other in clamping the connecting wire; one end being somewhat narrower than the body of the connector and bent at right angles toward

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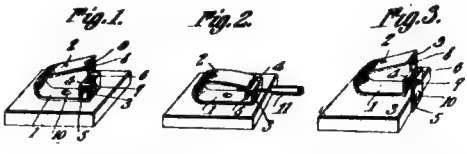
the opposing member forming a tongue 9 containing a hole 8 punched across the grains of the sheet metal to provide a contacting surface; the other end being formed and bent in the form of an inverted U as shown at 3, 4 and 5, the center portion 4 having a transverse opening 6 for the admission of the tongue 9, and the side portions 3 and 5 having contact holes 7 (hole in 5 is not visible in drawing, being on back side) which aline with hole 8 when the opposing members 1 and 2 are compressed, the slot 6 forming a perfect guide for the tongue 9 so that an exact alinement of the holes 7 and 8 is assured.

This idea is a good one, with the exception that there is only a small point of contact, and we do not think very heavy currents could be taken from



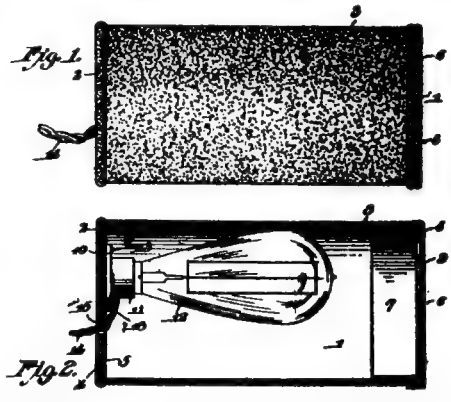
such a post on account of this. On apparatus using very little current, this post, however, should prove quite satisfactory. We believe that the post shown in Fig. 3 is a better idea than Fig. 1, as the screw 10 in Fig. 3 is more easily attached than in Fig. 1.

Mr. Neher might do well to re-design the appearance of the post itself, as it looks too cold and unattractive. Sometimes, an article, no matter how good, proves a failure because people do not take to it, notwithstanding that the idea is really a good one and is deserving. We believe by stamping a design in part 2 and making the lines of the binding post more graceful, a good market can be found for the post.

Mr. John Alden of Boise, Idaho, has invented an electric bed warmer. Extract of the patent is given below:

In accordance with my invention, I provide a drum, casing or body 1 which is preferably and is here shown as cylindrical in form and which may be of any other suitable shape. The said drum, body or casing is made of sheet metal and has a head 2 permanently secured at one end. The said casing, body or drum is covered on its outer side by some suitable non-conducting substance such as asbestos, as indicated at 3, the said asbestos covering extending also over the fixed head 2 as at 4 and on the inner side of the said fixed head is a similar non-heat conducting covering 5. The body, casing or drum is provided also with a removable head 6 which has a cylindrical flange 7 to fit in the end of said body, casing or drum and the said detachable head is also covered on its outer side with asbestos or other suitable non-conducting fabric or material as at 8 and is provided with a suitable number of air inlet openings 9. On the inner side of the fixed head 2 is a non-conducting base 10 having a socket portion 11 for the reception of the neck portion of an electric lamp 12 of usual construction, the said base and socket being also of the usual construction used in connection with electric lamps.

The one redeemable feature on the above patent is that the enclosure 6 may be removed without disturbing the lamp or its connections, the body of the warmer serving as a shield for the light rays and as a rigid support for the lamp. Of course there is nothing new about this invention except the feature of the top, which can be taken off. We think this device might even be improved by filling the space all around the lamp with powdered as-



bestos. It would then, of course, take a little longer to heat up the entire device. On the other hand, the warmer would keep its heat for a considerable period after the current has been turned off.

Mr. Geo. Garretson, of San Diego, Cal., has been granted Patent No. 1,005,192 on a binding post.

This seems to be the month for binding posts. A part of specification is given herewith:

The objects of the invention are, to provide a binding post which is simple of construction, easily installed, effective in use, comparatively inexpensive of manufacture, which is adapted to hold the wires securely without the necessity of soldering them, and in which the parts are not liable to become easily disconnected.

While the idea is new, we do not

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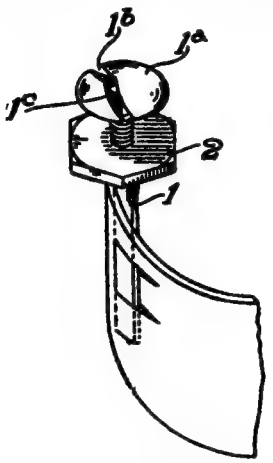
think that it will ever be bought by any manufacturer, for two reasons. The first reason being that a good binding post should be constructed in such a manner that the wire can easily be put on or taken off. The illustration of Mr. Garretson's patent shows this is not possible with his post. Furthermore, if the nut 2, becomes unfastened through vibration (as for instance, when used in an automobile), the bind-



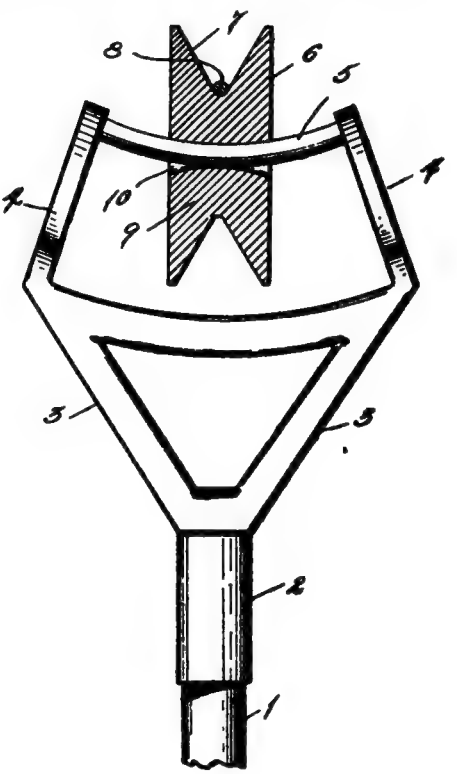
ing post becomes worthless, as the connection is not good any more and a loose connection is as bad as no connection at all. Consequently it comes down to this: An ordinary screw with one nut and the wire clamped between screw-head and nut, would be almost as effective as this binding post. By using a lock nut under the first nut we have a better binding post than the one shown above. For this reason the slots 1b and 1c as shown in Mr. Garretson's patent, really become unnecessary.

Patent No. 1,003,881, has been granted to Mr. Frank Criest, of Butler, Pa., on a trolley wheel. Part of specification is given below:

This invention relates to trolleys, and the objects of my invention are, first, to furnish a trolley pole with a harp that will allow the trolley wheel of the harp to shift and accommodate itself to the trolley wire or electric conductor; second, to provide a trolley harp and wheel that can be advantageously used upon high speed suburban electric lines; third, to provide a trolley harp that will normally maintain the trolley wheel thereof upon the trolley wire irrespective of any irregularities or curved sections of the wire, and fourth, to provide a trolley harp that is simple in construction, applicable to the present type of trolley pole, and highly efficient for the purposes for which it is intended.

We only mention this patent in order to show inventors what *not* to invent. While the idea itself is fairly good, it is a proven fact that each week almost, there are from five to six new patents on trolley wheels, as some inventors seem to have the idea yet, that great improvements can be made on the trolley wheels.

Somehow or other this is a mistaken notion, as the Traction Companies, for some personal reason of their own, refuse to buy trolley patents and seem to think that the old style wheel is about as good as anything that has been invented or for that matter, will be invented. Personally we agree on this point, and cannot at all encourage in-



ventors to invent new trolley wheels, as from a financial standpoint ninety-nine such patents out of a hundred are failures.

Our advice to trolley inventors is, not to invent any.

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Advice on Patents

ADVICE ON A NEW INSTRUMENT.

(1.) Edward Tietjens, New Jersey, writes as follows:

"I have invented what I call a "Milli-Current Detector" for detecting the slightest E.M.F., a battery or any other small source of power can contain. What I wish to know is: do you think this idea a good one; whether it is patentable, and if so, could it prove a money-maker? I also enclose herewith a rough sketch. The size of instrument is 3x4 inches.

"I hope you will answer me in your November issue."

A.—We do not quite understand the action of your apparatus and the way you have it sketched. We do not think it would be very sensitive; in fact do not think it would be as sensitive as a common volt meter.

MARKETING AN INVENTION BEFORE PATENTED.

(2.) B. Zeller, Calif., asks:

Q.—Is it a good plan to market an invention before patent has been applied?

A.—No invention should be marketed before the patent has been finally granted. The words on an article "Patent applied for' do not protect it at all and anyone may make the device up to and until the patent has been granted. Patents are sometimes filed for years in the patent office and for that reason it is easy to understand that as long as no real protection has been granted on the device, the inventor may just as well not have applied for the patent.

Take for instance, the Shoemaker patent shown in this issue, which was in the patent office for nearly **six years** before patent was allowed. Our advice to inventors is not to market an invention before the patent is actually issued.

PATENT SPECIFICATION.

(3.) Peter Martin, Ohio, writes:

"I have invented a new electrical device and would like to know if I could file the application myself. I find that Patent Attorneys charge more than I can well afford to pay, hence this letter. Kindly answer in your November issue."

A.—Our advice to you is not to attempt to send a patent specification to the patent office yourself. No matter how good a device is, it is worthless if it is not protected by a good patent. Inventors frequently make the mistake of trying to be "Penny Wise" and afterwards lose small fortunes. You cannot be too careful in the selection of a good patent attorney and one who has a large amount of experience in such work. The patent business is very intricate and highly specialized, and for this reason we would never recommend any private individual to try and make the patent application himself, as ninety-nine times out of one hundred such a patent has written across its face—"Failure."

TRUSTING A PATENT ATTORNEY.

(4.) Alfred Bostwick, Calif., writes:

"I have invented a very important electrical device and I am quite sure that it will prove a winner financially as well as otherwise. I have thought of sending model and description to a patent attorney, but could not see my way clear to do so, as I have been given to understand that great inventions have often leaked out from the office of patent attorneys, and the inventor often has gotten the worst of it. I would like to have your frank advice on this question, and if you think it is safe to trust a strange attorney with the patent."

A.—Your query is a very common one and is uppermost in the mind of practically every inventor.

We have never heard of any invention leaking out of the office of a patent attorney, but of course such thing is not an absolute impossibility. However, we would say that 999 times out of a 1,000 a patent is

(Continued on next Page)

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No attorney's fee until patent is allowed. Write for "*Inventor's Guide.*"

FRANKLIN H. HOUGH,
Loan and Trust Bldg., Washington, D. C

Specialist in Electrical Patents

The law provides that patents must be granted for any novel invention but it is necessary to obtain the best, expert legal advice in order to protect these inventions carefully. Send sketches or model and explanation, referring to parts by numbers or letters, and free advice as to patentability will be given. It is best to obtain the services of a reputable patent attorney who will safeguard your invention and make it salable and obtain the greatest number of claims possible.

More patents are worthless due to lack of proper protection of claims than from any other source.

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safe with a patent attorney, who is a professional man the same as your doctor. The profession of a patent attorney is such that it would invariably ruin his business and reputation if he tried to do underhand work, and we know of no case where a patent attorney has been benefited in any way by selling or otherwise giving away information on a new device sent in by his client. We think you will be perfectly safe in trusting a reputable patent attorney, especially those whom you see advertised in our advertising columns, all of whom are long established and well known.

IMPROVING ON A PATENT.

(5.)—Paul Seegan, Florida, writes:

"I have made an invention by means of which I improved on a device which is already patented and which I have been given to understand is a "basic" patent. My invention is such that it could not be used without the already patented article. Now what I would like to know is, will my improvement on the patented article give me a patent or would I have to be licensed by the patentee holding the basic patent?"

A.—Without knowing what the patent is of which you speak, and without knowing what your invention is, it is hard to give you an exact answer. However, from experience in similar lines, we would say that if the basic patent to which you refer to is valid, you can, notwithstanding this, obtain a patent on your improvement over the other patent. However, this does not mean that you have a right to manufacture your article, inasmuch, as in doing so you would naturally be infringing on the basic patent held by the other patentee. For this reason it would come down to the following: If the article is to be placed on the market and you think that your improved article will be a commercial success, the best thing to do would be to quietly purchase the basic patent from the patentee, providing, of course, he will sell it. If he is not inclined to do so, the next best thing would be to sell your patent, if he can afford it, or is inclined to pay your price. If this does not work out, the only other practical way out would be to form a company which would buy the two patents or else try and sell the two patents to an existing company.

This is quite a common occurrence and such cases are not by any means unfrequent.

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Ex-Examiner U. S. Patent Office
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Wireman	Plumbing & Heating
Mining Engineer	Chemist
Telephone Expert	Bookkeeper
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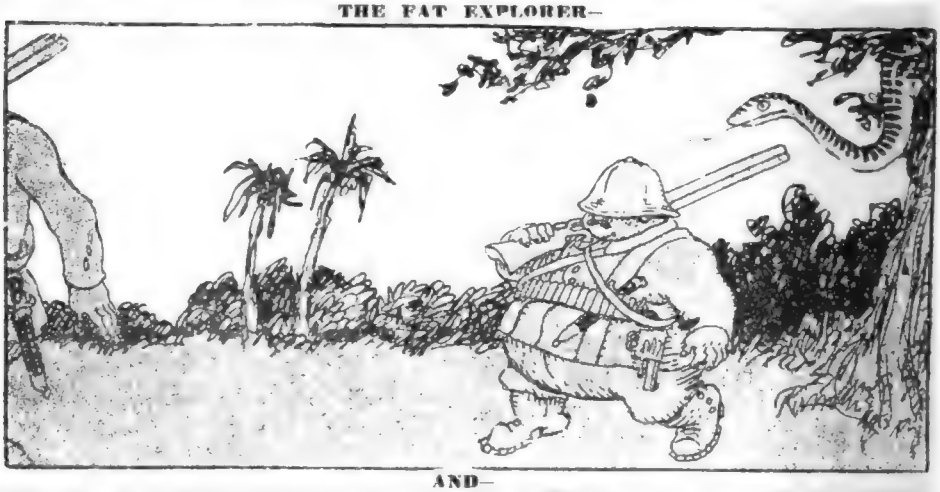
Flying Sparks

THE FAT EXPLORER—



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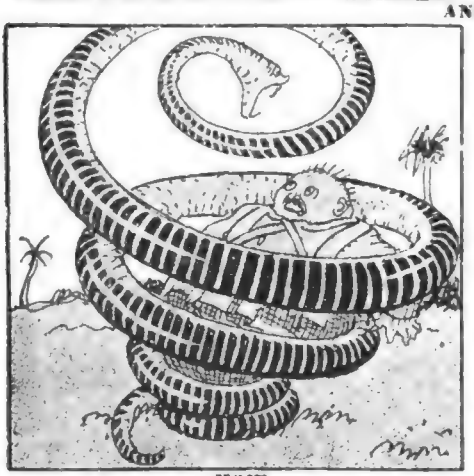

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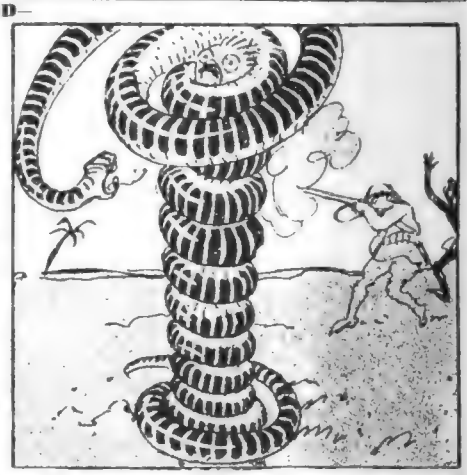

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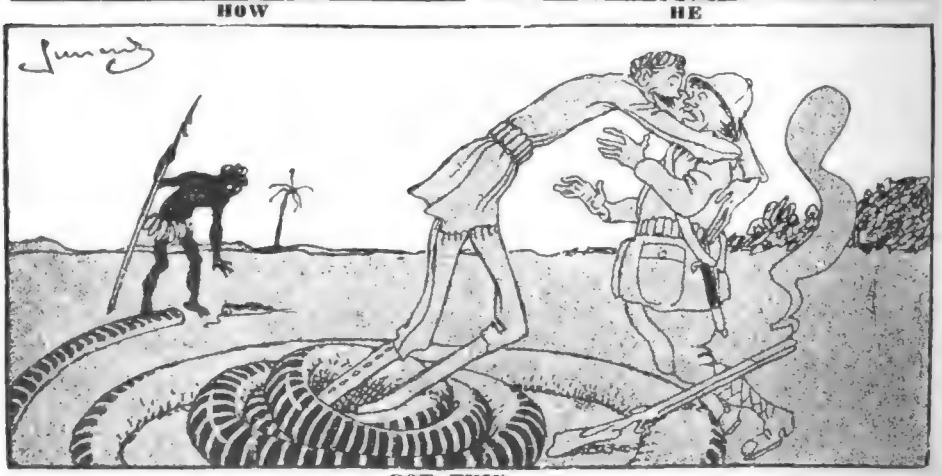

GOT THIN.

—Carus T Carvlus

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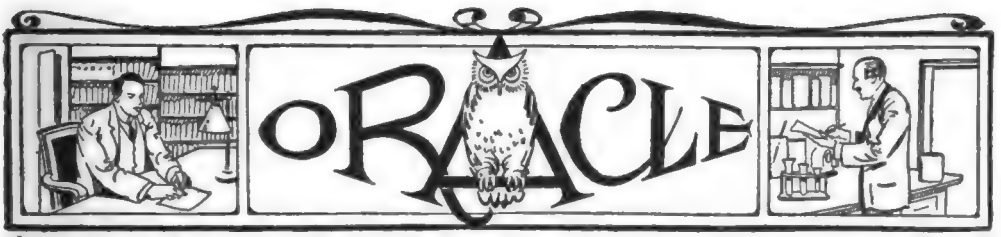

Queries and questions pertaining to the electrical arts, addressed to this department, will be published free of charge. Only answers to inquiries of general interest will be published here for the benefit of all readers.

On account of the large amount of inquiries received, it may not be possible to print all the answers in any one issue, as each has to take its turn. Correspondents should bear this in mind when writing.

Common questions will be promptly answered by mail if 10 cents to cover expenses have been enclosed. We can no longer undertake to furnish information by mail free of charge as in the past. There are as many as 150 letters a day now and it would be ruinous for us to continue acting as a free correspondence school.

If a quick reply is wanted by mail, a charge of 15 cents is made for each question. Special information requiring a large amount of calculation and labor cannot be furnished without renumeration. THE ORACLE has no fixed rate for such work, but will inform the correspondent promptly as to the charges involved.

NAME AND ADDRESS MUST ALWAYS BE GIVEN IN ALL LETTERS. WHEN WRITING ONLY ONE SIDE OF QUESTION SHEET MUST BE USED; DIAGRAMS AND DRAWINGS MUST INVARIABLY BE ON A SEPARATE SHEET. NOT MORE THAN THREE QUESTIONS MUST BE ASKED, NOR SHALL THE ORACLE ANSWER MORE THAN THIS NUMBER. NO ATTENTION PAID TO LETTERS NOT OBSERVING ABOVE RULES.

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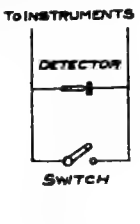
DETECTOR TROUBLE WHEN SENDING.

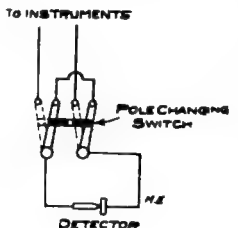
(1052.) H. Hancock, Cal., writes:

Q. 1.—Please state in "Oracle" why it is, when my transmission key is pressed, it spoils the detector, and same has to be readjusted?

A. 1.—The induced currents from the leads of the transmitting outfit in the wires of the receiving set, burn the sensitive contact part of the detector. This effect can be readily overcome by "shorting" the detector, which is accomplished (Fig. A) by using a single point switch as shown. To obtain the very best results, however, the detector should not only be short-circuited, but completely disconnected from the receiving apparatus. This may be accomplished by using a pole changing switch and connecting same as shown in Fig. B. By throwing the switch, the detector is both disconnected as well as short-circuited, protecting it from the induced currents.



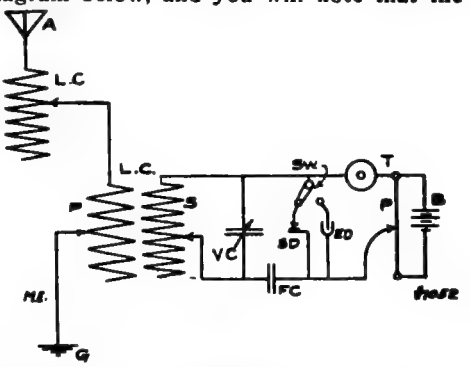
-FIG. A-



-FIG. B-

Q. 2.—Please furnish me with a diagram of the following instruments: Tuning transformer, single slide tuner, one fixed condenser, one variable condenser, silicon and electrolytic detectors, potentiometer, batteries, and 2,000 ohm receivers.

A. 2.—We are giving you the proper diagram below, and you will note that the



tuner is used as a loading coil in the aerial circuit.

MANUFACTURED SECONDARIES.

(1053.) Sewall P. Smith, Md., writes:

Q. 1.—I have an aerial made of No. 14 aluminum wire. It is 35 feet high at one end, and 20 feet at the other. My instruments are: one single slide tuner, with about 250 feet of No. 24 wire on it. One carborundum detector, one fixed condenser, and one 80 ohm telephone receiver. How far should I be able to receive with this apparatus?

A. 1—You fail to state the length of your aerial, which is a very important factor. As stated in previous issues of *Modern Electrics*, the determination of ranges with rough data is little more than guess work. With an aerial 100 feet long, and with the apparatus mentioned in your letter, you probably would be able to receive a distance of 60 to 100 miles.

Q. 2.—How much, and what size wire should be used in making a ½ inch spark coil?

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A. 2.—The following data taken from our publication "Construction of Induction Coils and Transformers," (prepaid, 25c), states: Primary wound with 225 turns of No. 20 D.C.C. wire on a core ½ inch in diameter. Secondary wound with 4 oz. of No. 38 enameled insulated wire.

Q. 3.—Are the secondaries made by Dawson & Winger Electric Co. of Chicago, Ill., all right to use in making the ½ inch coil, instead of winding it myself?

A. 3.—We recommend manufactured secondaries in preference to those which you might make. To begin with, they are correctly constructed to give the maximum efficiency, and designed to have the highest insulation possible. Inasmuch as the cost is reasonable, it is far better to purchase completed secondaries than to attempt the making of same.

A GENERATOR FOR A WIRELESS SET.

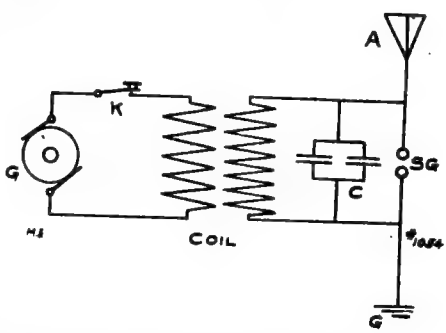
(1054.) A Brizzolari, N. Y., requests:

Q. 1.—In your next issue will you please tell me if I could use a 36 watt motor generator in connection with my wireless sending set, consisting of a 1 inch spark coil, two ½ pint Leyden jars, spark gap, and key.

A. 1.—You do not state whether the motor generator is to transform direct to alternating current, or vise-versa, or whether it is to step down the power line voltage to lower voltages. Presuming that the later is the case, we would state that the generator will give excellent results if the voltage is from 6 to 10 volts.

Q. 2.—Kindly give me a hook-up for the entire outfit.

A. 2.—We comply with your request below.



POULSEN WIRELESS STATIONS.

(1055.) Stanley Patten, N. Y., asks:

Q. 1.—Are there any Poulsen wireless stations in the vicinity of New York City, and if so, kindly give location and their call letters?

A. 1.—To our knowledge, there are no land stations using that system near New York. However, we believe that the Scandinavian Line steamers employ the Poulsen system on some of their steamers, and the call letters may be obtained from the "Blue Book."

Q. 2.—Has the United Wireless Station at Coney Island been rebuilt since the Dreamland fire?

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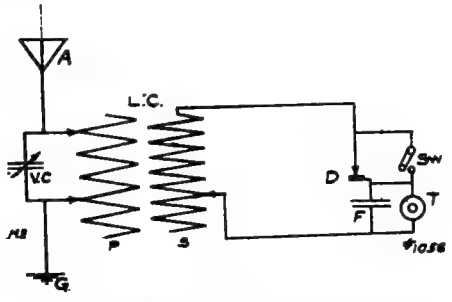
A. 2.—Not to our knowledge.

A HOOK-UP.

(1056.) Louis Bogart, N. Y., writes:

Q. 1.—Would you kindly give me a hook-up for the following instruments: Loose coupler, condenser, variable condenser, silicon detector, 1,000 ohm head receivers, and 1 switch.

A. 1.—We are giving you a diagram covering the apparatus mentioned in your letter.



Q. 2.—How far can I receive with an aerial 60 feet high, 50 feet long, made of four wires 1 foot apart?

A. 2.—We would estimate the receiving range at approximately 100 to 200 miles at the most.

THE SILICON TICKER.

(1057.) Robert F. Adams, Tex., states:

Q. 1.—I wish to construct a silicon ticker like the one described in the May issue of *Modern Electrics*. As I have no access to alternating current, for the operation of same, I would ask whether a high pitch buzzer with several dry cells could be substituted. This would send a pulsating current through the magnet.

A. 1.—We do not believe that the buzzer interruptions would serve the same purpose as the alternating current. The direct current from the batteries would soon magnetize the magnet permanently, making it inactive after a short period. The best suggestion is to construct a commutator for changing the direct current to alternating, which may be made as described on page 363 of the September issue. This commutator revolved by a small battery motor, would meet the requirements successfully.

Q. 2.—Is a 2 inch wireless coil injured by being operated with the secondary short-circuited?

A. 2.—For short intervals, no effect will result, but should the coil be used in this manner for a long period, the secondary will heat up to a point where the insulating compound melts, breaking down the insulation strength. The coil, taking more current under this operation, is also apt to spoil the contacts on the vibrator.

USING THE ELECTROLYTIC INTERRUPTER.

(1058.) Alan H. Arthur, Mich., asks:

Q. 1.—Is it safe to use an electrolytic interrupter in connection with a closed core transformer?

A. 1.—No, the voltage produced in the secondary of a transformer using the elec-

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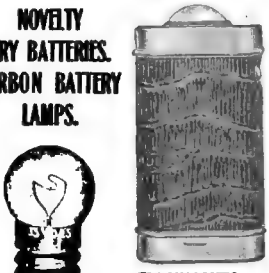

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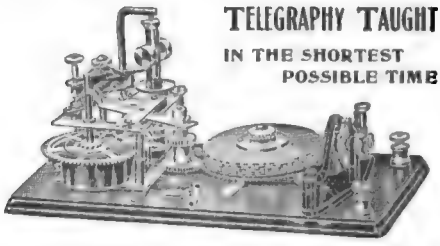

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trolytic interrupter is extremely high, and an ordinary closed core transformer would probably break down under the strain.

Q. 2.—What would you suggest if the electrolytic interrupter is unsatisfactory?

A. 2.—Either a mercury break operated by a small motor, or a motor generator set, changing the direct current to alternating.

Q. 3.—What are the dimensions of a suitable helix for a ½ kw. closed core transformer?

A. 3.—The dimensions giving good results are: Diameter of frame, 12 inches, with six uprights, upon which are wound the turns of the wire. The wire should be No. 4, either copper, brass, or aluminum. About 60 feet of the wire should be used to give a suitable variation of the wave length.

A PRACTICAL TEXT BOOK.

(1059.) John Ahlers, N. J., enquires:

Q. 1.—Kindly inform me of a book which covers the electrical field in a thorough manner, yet gives only the necessary information. I want a book having plenty of tables and data for figuring the problems.

Q. 2.—We know of no better book than "Practical Applied Electricity," by David Penn Moreton, B.S., E.E., sold by us at $2.00 a copy, and 12c in addition to cover the mailing. It is a compact little book, of 450 pages, pocket size, containing 273 line cuts, and 50 half-tones. It covers the field in a thorough manner, giving the maximum information within the limited space. Circulars of this publication will be sent to any interested parties.

A RECEIVING CONDENSER QUERY.

(1060.) Edward J. Bennett, Ohio, states:

Q. 1.—I have constructed a variable condenser (slide plate type) consisting of 8 stationary and 7 movable plates. The instrument is properly made with a suitable gap between the plates. There is no short circuit in the operation at any time. It does not eliminate the signals entirely, but makes them much weaker. What is the reason?

A. 1.—Contrary to the general mistaken idea that a condenser increases the intensity of signals, in some cases the signals are decreased for reasons as follows: A variable condenser is used for more accurate tuning than can be accomplished with the other apparatus. It is evident therefore, that the circuit in which the variable condenser is being used has already sufficient capacity, and by adding more capacity, you place it further out of tune. In such an instance, the condenser may be used to better advantage by placing it in series with the ground connection, thus reducing the circuit's capacity, instead of increasing it.

Q. 2.—If lightning strikes an aerial grounded on a water pipe, will a shock be felt by a person touching the water pipe?

A. 2.—Unfortunately, we have no information regarding the subject which you mention. It would seem, that if the water

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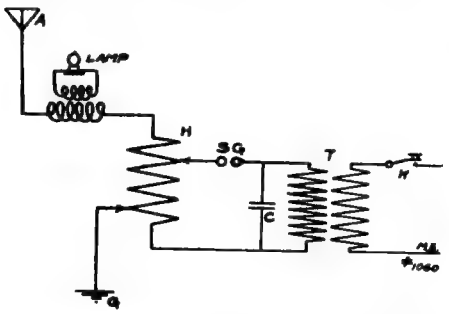
pipe is a perfect ground, the lightning will travel directly to the ground, and a person touching the pipe will not be affected.

Q. 3.—Is a Geissler tube left in the aerial when sending?

A. 3.—Usually it is, though it is better to remove it after the aerial has been tuned with the oscillation circuit. In large sending sets, it will have practically no effect, but in small sets, considerable energy will be wasted, cutting down the effective range.



The best method is to have a coil made of several turns of the lead-in wire, in the aerial circuit, and another coil made of a few turns of No. 14 rubber covered wire connected to a Geissler tube or small lamp, a few inches away, as shown in the diagram. This method detracts practically no energy from the sending set, and still indicates the intensity of the aerial current.

SUBSCRIPTION RATES.

(1061.) Edward J. Nolan, N. Y., writes:

Q. 1.—In places I have noticed two different car lines cross each other the wires being insulated from each other. If the pole from a car using the first wire, swings over and touches the other wire, will it short-circuit the line?

A. 1.—Your query is not very clear. If you mean that, the trolley pole off one car swings over accidentally and strikes the wire of the other track, will the current be short-circuited? The answer is that nothing will happen electrically. The wires all carry the same voltage, and the ground, or better stated, the rails, return the current to the generators. Therefore, inasmuch as the voltage and polarity on the circuits are alike, the trolley pole from the car will carry the same current as if it was being used on its own wire.

Q. 2.—In the Editorial Page of *Modern Electrics*, you state that the subscriptions cost $1.00 for U. S. and Mexico, and $1.25 for Canada and New York City. Why is it $1.00 in all parts of the United States, and $1.25 for New York City?

A. 2.—The postal authorities require magazines for New York City to be carried as stamped mail, at 2c per copy. The magazines for other parts of the country, not included in Manhattan Island, are carried as weight mail, at a fraction of the cost of stamped mail. Hence the increased rate for New York City subcriptions.

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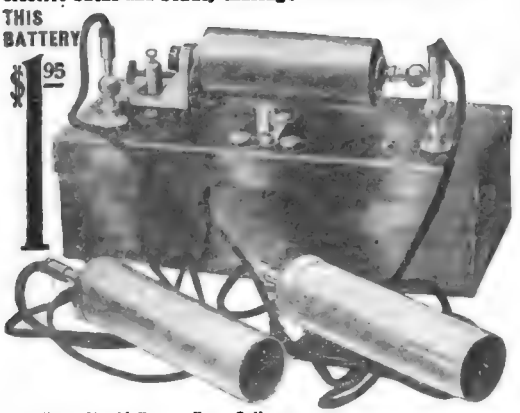

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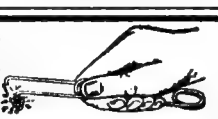

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Q. 3.—Why does a company list an article in their catalogue at double the price, and give a discount of 50 per cent., instead of giving the net price in the first place?

A. 3.—Your question is more of a commercial character than electrical. We would state that the reason for the above practice used by large electrical supply houses, is that the prices on their supplies are continually varying. By printing new discount sheets from time to time, the advance in prices is taken care of. On the other hand, were the net prices printed in the catalogue, it would necessitate the reprinting of the entire catalogue at a great expense. There may be other reasons, best known to those employing the system.

CONNECTING TRANSFORMERS.

(1062.) Jos. P. Bruell, N. J., asks:

Q. 1.—Is the Worts-McKisson a good transformer?

A. 1.—Yes, it is recommended by its users.

Q. 2.—Can I connect two one-quarter kw. transformers and obtain one-half kw?

A. 2.—By connecting the primaries and secondaries in parallel, you will obtain almost the efficiency of a one-half kw. transformer.

MULTIPLE CONTROL SYSTEMS.

(1063.) Alfred Powers, Ark., asks:

Q. 1.—Upon what principle does the multiple control systems for electric railways operate? What is the advantage of such systems, and why not operate with one controller the entire current for the car?

A. 1.—Heavy currents are required for running railroad car motors. It would be impractical to have one controller handle the entire current. In accordance, a number of controllers are used, one for each car, governed from a master controller. The master controller, in the Sprague G. E. control, carries a small current which operates a number of selenoid switches under the different cars. The cars are connected together and to the main controller by means of plugs and sockets, with pieces of heavy cords having a number of wires within them. There is a separate wire for each selenoid switch, so that the different speeds and reverse may be operated. These connecting wires are called "jumpers," and are placed under the platforms next to the air brake hose. By moving the master controller, the proper contacts are made which operate the individual selenoids, closing the circuits of the resistance and motors. There are various other systems for multiple control, among which the Westinghouse system is largely used.

Q. 2.—How does the hand signals on trolley systems operate?

A. 2.—The simplest possible system is shown in the accompanying diagram, which consists of two banks of lamps, and two double throw-knife switches. The switches are usually of the spring operated type, so that it will be either making one contact or the other at all times. The motorman arriving at one end, throws the switch, causing the lights at both ends to light. On

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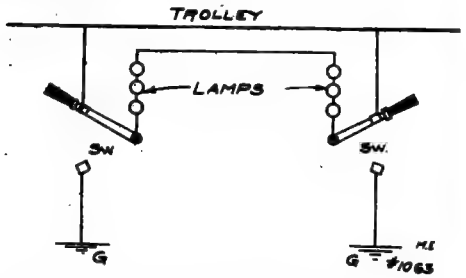
arriving at the opposite end of the stretch of track, he throws that switch turning out the lights. The cars coming in the opposite direction, seeing the lights, are thus informed that the block is being used, and await for the car to come by. Automatic block signals are rapidly displacing these unreliable hand operated systems on the better electric railroads.



Q. 3.—I have heard that the armature of the motor used in the N. Y. C. & H. R. R. R. is made directly on the shaft of the wheels. Is this so?

A. 3.—Yes, on a large number of their electric locomotives, they have the armature and commutator built around the shaft of the wheels.

INDUCTION GENERATOR.

(1064.) William Bossart, Mass., asks:

Q. 1.—What is an Induction Generator?

A. 1.—An induction generator is one where the field and armature windings are wound on the same frame, and are stationary. A heavy mass of iron, laminated, and with many teeth, is revolved in the centre of the many poles containing these windings. Induction generators are used where it is desired to obtain high voltages, for it is more practical to insulate stationary windings than rotating ones. High frequency generators may also be constructed in the same manner.

Q. 2.—Do induction motors keep at the same speed under all conditions of load, and if not, what is the variation?

A. 2.—No, the speed varies in proportion to the load. At no load the motor is running in synchronism to the generator, but as the load increases the speed decreases. In large motors, the speed will often fall as low as 98 per cent, while in small motors, it is even more noticeable, sometimes going down to 92 per cent. This drop in the speed under load, is known as the "slip."

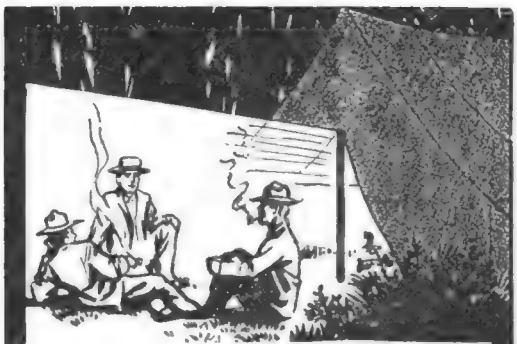
Q. 3. Are Induction Motors practical for all sizes?

A. 3. By all means, yes. The rapid growth of alternating current power circuits is more than a proof of the superiority of induction current motors over direct current types. The absence of commutation troubles is one large difficulty overcome in the favor of the induction motor.

A HORSE-SHOE ELECTRO-MAGNET.

(1065.) B. O. Meredith, Pa., asks:

Q. 1.—How can I make an electro-magnet of the horse-shoe type vibrate a disc very loudly?



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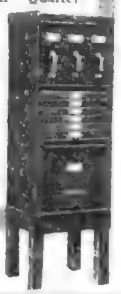

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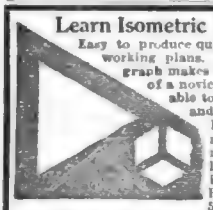

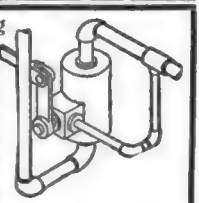

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LONG DISTANCE WIRELESS CO. SUPPLIES
CEO. S. SAUNDERS & CO.
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A. 1.—We would suggest that you bend a piece of soft iron rod into the proper shape and upon this wind the necessary wire. The two poles of the iron should be brought near the diaphragm. If the disc is sufficiently large in size, the sound set up will be quite loud.

Q. 2.—What size wire, and how many layers and turns do you advise for the magnet?

A. 2.—You fail to state any definite data. We would suggest winding on each arm of the magnet, 8 layers, 2 in. long, of No. 20 d.c.c. which will require four dry cells to operate to the right capacity. Both the spools must be connected in series, with proper care that the current in each is flowing in opposite directions.

A LOOE-COUPLED HELIX.

(1066.) Robert L. Brown, Calif., writes:

Q. 1.—Please tell me how to construct a loose coupled helix for a 2 k. w. transformer. I wish to construct the primary over the present one I am using, which is 15 inches in diameter, wound with 9 turns of No. 4 wire. I want to know what size wire to use, how much I need, and the proper distance between the primary and secondary.

A. 1.—Usually the secondary has upwards of 20 turns, and with 9 turns, there is little opportunity for obtaining the step up in current which is also sought in using a loose coupled helix. However, inasmuch as you wish to use your present helix, we would suggest the primary being made of 10 turns of No. 10 aluminum wire. The outside diameter of the turns should be 17 inches, thereby allowing at least 1 inch between the supports of the primary and the wire of the secondary. This will require 45 feet of wire.

A TESLA COIL FOR WIRELESS.

(1067.) Rufus M. Robbins, Fla., states:

Q. 1.—I would like to know whether a Tesla Coil could be used for wireless telegraphy.

A. 1.—Yes, a Tesla Coil of suitable size may be used for wireless telegraphy. In fact, a loose coupled helix is nothing more than a Tesla coil, for it serves in many cases to increase the potential of the oscillation circuit before charging the aerial. In wireless telephony a form of Tesla Coil is likewise employed to raise the voltage The usual form of a Tesla Coil however, is not used for wireless.

A MOTOR FIELD WINDING.

(1069.) Edwin Van Buskirk, Colo., requests:

Q. 1.—The size of copper wire on field of one-sixth h.p. old type Edison motor for 110 volts, direct current?

A. 1.—You do not state sufficient data. The type of the motor is not stated, but we presume that you mean a bi-polar type. If there remains any wire on the field, we would suggest that you use the same size for rewinding. If the entire winding still remains, remove same and after taking the size of the wire accurately with a wire gauge, rewind the same number of layers

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with new wire. This practice is resorted to by the electrical repair shops when a field winding is in bad condition and requires rewinding. If you will state complete information, stating the exact type of the motor, dimensions of the fields, pole pieces, etc., we may be able to give you the exact data.

THE FOURTH YEAR OF THE TUNGSTEN LAMP.

About four years have elapsed since the introduction of the Tungsten lamp in the commercial field. It is interesting to note how the new form of illumination was received and has progressed.

When the Tungsten lamp was first introduced, the central station men held the opinion that it would be detrimental to their revenue, inasmuch as the amount of power used would be greatly decreased. It is strange to note that the effect has been entirely to the contrary, for the new form of electric lamp has made it possible for the central station people to invade new fields, where gas and oil were formerly employed for lighting. In these instances, the convinced saving in the use of the Tungsten lamps, caused the change from the primitive methods used. Ever since the financial panic of 1907, the electrical business has shown an average steady increase, and probably a good share is due to the new lamp.

In many places, such as stores, large halls, and even theatres, arc lamps were employed, and maintained by the central station people. These were a constant source of trouble, and the Tungsten lamp was gladly welcomed as an efficient substitute for the arc lamps. Summing up, we might state that on the whole, the Tungsten lamp marks one great milestone in the steady conquest of electricity in every field.

THE SPRINGFIELD WIRELESS ASSOCIATION.

The attention of the readers is called to the changes in the offices of the Springfield Wireless Association of Springfield, Mass. The officers at present are A. C. Gravel, president; C. K. Seely, vice-president, and D. W. Martensen, secretary.

The Fact that "W-M" Apparatus is in use by the U S. Army and Commercial Companies is proof of its reliability.

Send 2c postage for large Wireless Catalog listing High Power Apparatus of quality and dependability.

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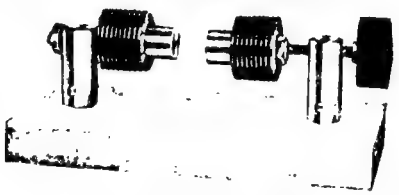

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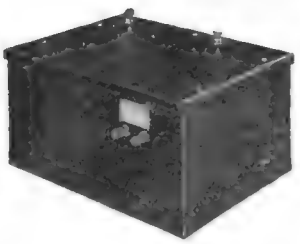

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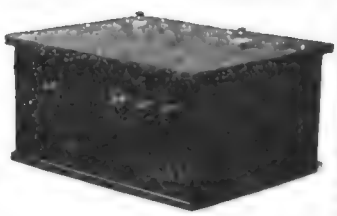

¼ K. W.	$12
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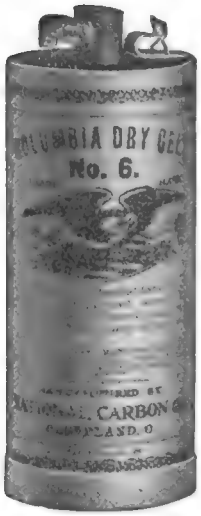

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Black enameled wire, sizes from 18 to 22, per lb., 45c.

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B. HAUPT, Prop. Established 1888

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THE NASSAU BOULEVARD MEET.

The Nassau Boulevard Meet proved very successful, though no Sunday flying was permitted by the police authorities. Among the special features was the transportation of the United States Mail via aeroplane. The mail was collected from special boxes erected around the field, brought to a tent where the stamps were cancelled with the aerial post mark, and then placed in the regulation mail sack and handed to the aviator. Earl Ovington carried the greater part of the mail during the meet. The sacks were thrown to the ground when the aeroplane arrived over a field at Mineola, where the post master was waiting with an automobile. From the field, the sacks were rushed via automobile to the post office and then handled in the usual manner.

The Deperdussin Monoplane made its first appearance in America, piloted by Geo. W. Dyott. The monoplane is a French invention, and possesses remarkable qualities, among which the speed is noteworthy.

The interesting feature of the meet was the exhibitions given by the military and naval aviators. The aeroplanes enabled the aviators to find a group of 20 soldiers hidden in ambush at the farther end of the field during one of the tests for determining the value of airships for scouting purposes.

Mlle. Helene Dutrieu, the French aviatrice, was one of the entrants with her Henri Farman biplane. She broke the duration record for women in America by flying 1.04 hours. Miss Quimby and Miss Moisant were also strongly in evidence, and did many feats to claim the applause of the audience.

An interesting wireless experiment was performed by George Wilson riding with Lieut. Milling. The apparatus used was invented by Harry Horton, who partook in the experiments by being at the receiving end. Successful firing at targets from aeroplanes figured among the many military features.

However, the Nassau meet can hardly be compared with the Belmont Park meet held in October 1910. The fire and spirit exhibited in the Belmont

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Park meet has never been displayed elsewhere in this country. The best aviators have since been killed, namely, Moisant, Hoxey, and Johnstone, which probably accounts for the lack of interesting flying. The circus flying, by which is meant flying of a dangerous and reckless nature, has become obsolete, and instead, the saner and more scientific contests are coming to the front.

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Bear in mind the course we give is not a book of alphabets, but a complete course in show card writing arranged by one of New York's Clever Show Card Artists. Just write us now! At once! Not later! (and enclose 4c. in stamps for booklet, and further particulars and testimonials. It's a great offer! it's a great opportunity! Don't neglect it. We have many pleased people who have accepted our offer. Why not you! Remember this! it's the employer WHO CAN DO THINGS that is always in demand, not the ordinary help.

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We call these mechanisms

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the Virtuolo "air muscle fingers," because their sensitiveness makes them *a real substitute for human fingers playing on the keys.* They are so keenly responsive that *they produce any effect in music that you desire* the instant you send them your instinctive signal through pedals, buttons or tempo lever.

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It is hoped that with this equipment, Uncle Sam will be able to keep a fatherly eye over the movements of his fleet, being in constant communication with vessels to a range of 2,000 miles. Constant communication is looked forward to with Guantanamo, Cuba, where a naval base is being established. It will be interesting to note the new records which will be established when this set is placed in operation.

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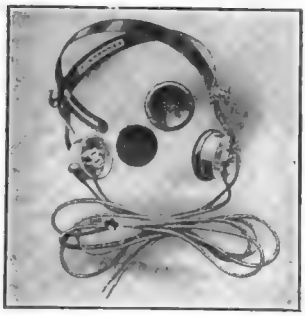

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Mar. 3, 1911	3.77	4.50	5.23	5.96
Apr. 4, 1911	4.25	4.99	5.84	6.57
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June 1, 1911	8.27	9.00	7.79	9.00
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Aug. 2, 1911	10.71	11.19	9.49	9.89
Aug. 23, 1911	11.35	11.84	10.10	10.58
Sept. 1, 1911	10.83	11.31	9.25	9.49
Sept. 8, 1911	11.19	11.92	8.57	9.06
Sept. 18, 1911	10.50	12.00	9.25	10.00
Sept. 28, 1911	10.75	12.25	9.50	10.25
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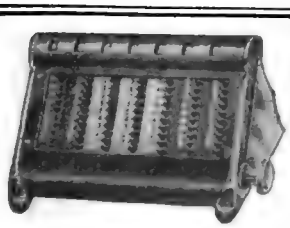

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Advertisements for the December issue must be in our hands November 20th.

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TYPEWRITERS: Caligraph, $6.00; Hammond, Yost, Densmore, Williams, $10.00; Remington, $12.00; Smith Premier, $15.00; Oliver, $24.00; Underwood, $30.00; all makes on hand; fifteen days' trial allowed, and a year's guarantee. Send for catalogue. Harlem Typewriter Exchange, Dept. M.E., 217 West 125th St., New York City. (1)

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WIRELESS OPERATORS! My new speed chart will teach you to receive from the fastest operators. Morse Continental and Navy codes on one chart, 50 cents. No stamps. Fred Fulgora, Box 356, North Diamond Station, Pittsburg, Pa.

SMALLEST BIBLE ON EARTH! New Testament, 250 pages; smaller than a postage stamp and illustrated. 12 cents, postpaid. Address C. Emig, Jr., 221 23rd St., Brooklyn, New York.

ELECTRICAL DICTIONARY. 224 pages, 25c. Book catalog for skilled tradesmen and experimenters free. Scientific Book Shop, 311 Syracuse, N. Y. (1)

READ "THE MAIL ORDER MERCHANT," a monthly money making magazine. Special six months only 15c. H. I. Latz, Atlantic City, N. J. (1)

PRACTICAL MECHANICAL BOOKS for home study, all trades, catalogue for stamp. Crescent Book Store, 329 S. Halsted St., Chicago, Ill. (2)

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MAGIC BY MAIL: Prospectus and catalog, 10c. National Magic School, 1193 Broadway, New York City. (1)

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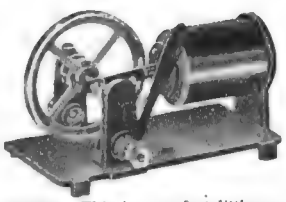

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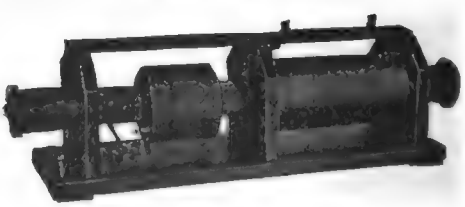

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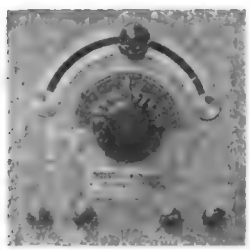

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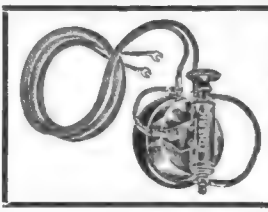

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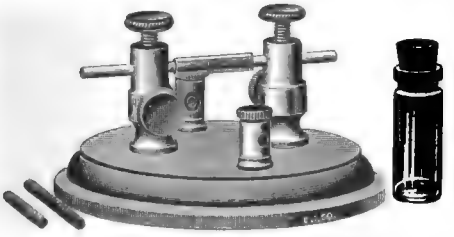

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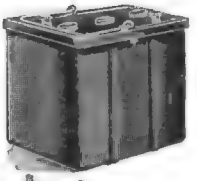

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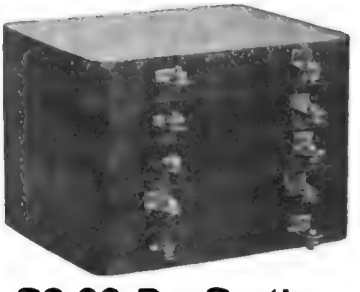

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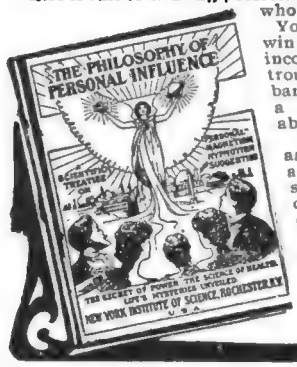

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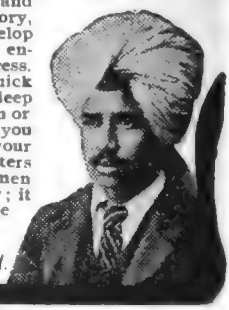

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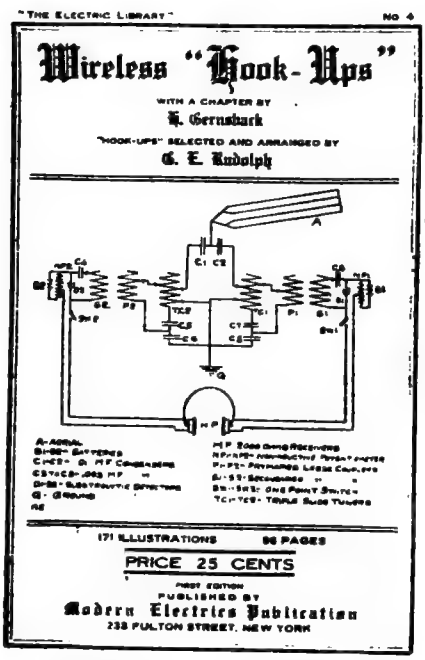

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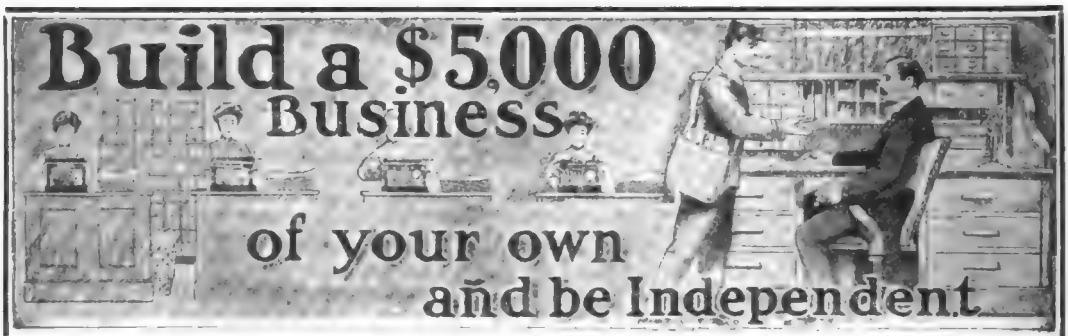

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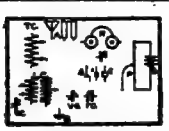

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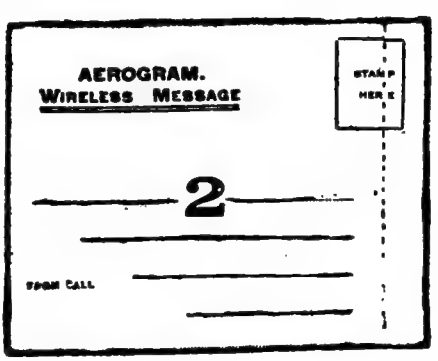

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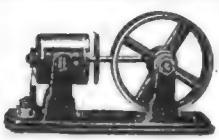

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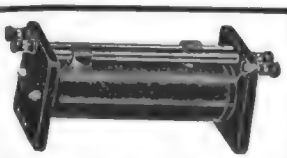

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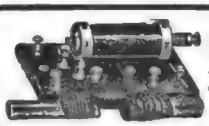

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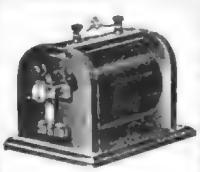

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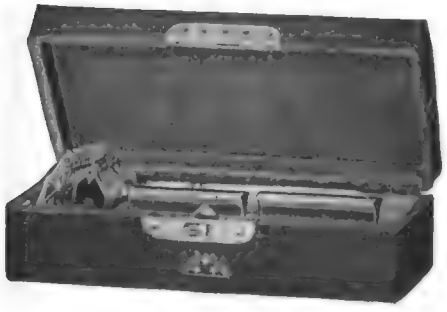

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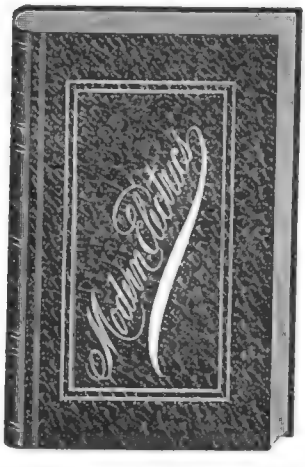

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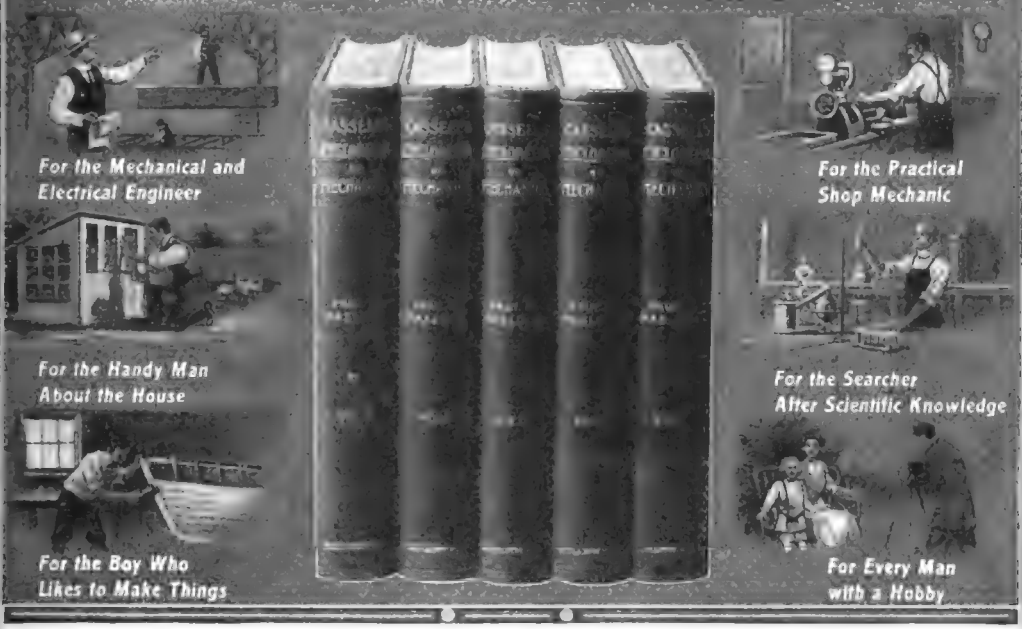
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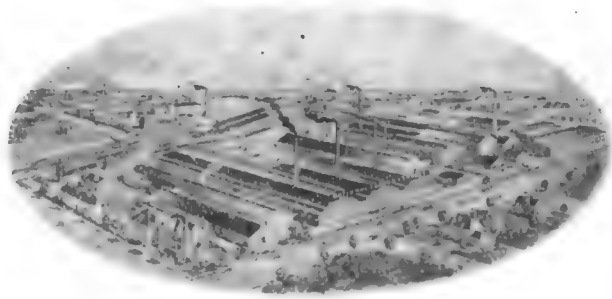

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Wireless Association of America

THE Wireless Association of America has been founded with the sole object of furthering the interests of wireless telegraphy and telephony in America.

We are now on the threshold of the wireless era, and just beginning to rub our intellectual eyes, as it were. Sometimes we look over the wall of our barred knowledge in amazement, wondering what lays beyond the wall, as yet covered with a dense haze.

However, young America, up to the occasion, is wide awake as usual.

Foreign wireless experts, invariably exclaim in wonder when viewing the photographs appearing in each month in the "Wireless Contest" of MODERN ELECTRICS. They cannot grasp the idea that boys 14 years old actually operate wireless stations successfully everyday in the year under all conditions but they are all of the undivided opinion that Young America leads the rest of the world wirelessly.

So far America has led in the race. The next thing is to stay in the front, and let others follow. In fact he would be a bold prophet who would even dare hint at the wonders to come during the next decade. The boy experimenting in an attic to-day may be an authority to-morrow.

As stated before the Wireless Association's sole aim is to further the interests of experimental wireless telegraphy and telephony in this country.

Headed by America's foremost wireless men, it is not a money-making institution. There are no membership fees, and no contributions required to become a member.

There are two conditions only. Each member of the Association must be an American citizen and MUST OWN A WIRELESS STATION, either for sending or for receiving or both.

The Association furnishes a membership button as per our illustration. This button is sold at actual cost. Price 20 cents.

This button is made of bronze, triple silverplated. The flashes from the wireless pole are laid in hard red enamel, which makes the button quite distinctive. The button furthermore has the usual screw back making it easy to fasten to buttonhole. The lettering itself is laid in black hard enamel. Size exactly as cut.

On account of the heavy plating it will last for years and is guaranteed not to wear "brassy." Beautiful solid gold button, $2.00.

Its diameter is 3-4 inch. This is a trifle larger than usual, the purpose being to show the button off so that it can be readily seen from a distance. The reason is obvious. Suppose you are a wireless experimenter and you live in a fairly large town. If you see a stranger with the Association button, you, of course, would not be backward talking to the wearer and in this manner become acquainted with those having a common object in mind, which is the successful development of "wireless."

The Association furthermore wishes to be of assistance to experimenters and inventors of wireless appliances and apparatus, if the owners are not capable to market or work out their inventions. Such information and advice will be given free. Somebody suggested that Wireless Clubs should be formed in various towns, and while this idea is of course feasible in the larger towns, it is fallacious in smaller towns where at best only two or three wireless experimenters can be found.

Most experimenters would rather spend their money in maintaining and enlarging their wireless stations, instead of contributing fees to maintain clubs or meeting rooms, etc., etc.

The Board of Directors of this Association earnestly request every wireless experimenter and owner of a station to apply for membership in the Association by submitting his name, address, location, instruments used, etc., etc., to the business manager. There is no charge or fee whatever connected with this.

Each member will be recorded and all members will be classified by town and State.

Members are at liberty to inquire from the Association if other wireless experimenters within their locality have registered. Such information will be furnished free if stamped return envelope is forwarded with inquiry.

SEND TO-DAY FOR FREE APPLICATION CARD

SPECIAL THIS MONTH

On receipt of 30 cents cash, stamps, or money order, we will send you above Wireless Button and the Third Annual Blue Book. Order to-day.

The Association Numbered November 1 1911 **14,162** The Greatest Wireless Association in the World.

ADDRESS ALL COMMUNICATIONS TO

WIRELESS ASSOCIATION of AMERICA

233 FULTON STREET

NEW YORK

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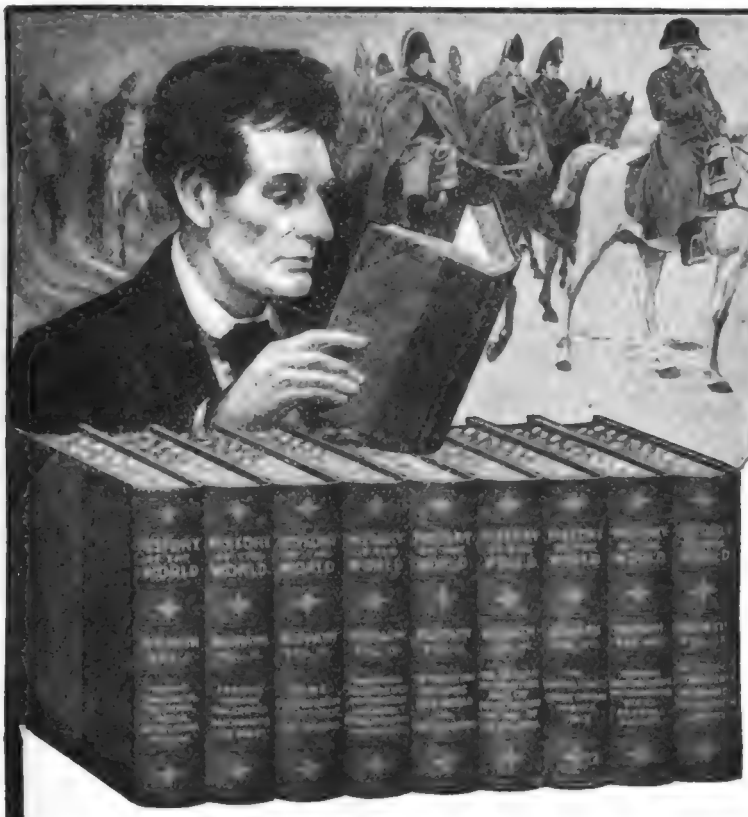

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Compiled by H. W. SECOR

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A large Demonstration Tesla Coil.
Experimenting with the Tesla Coil.
The High Tension Transformer.
How to build one-half to 3-kilowatt Closed Core Transformers.

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Table of Spark Coil Dimensions one inch to twenty inch.
Table of Spark Coil Dimensions, one inch to twelve inch, *heavy spark.*
Table of Dimensions one-quarter inch to ten inch with enamel wire secondaries.
Table of open and closed Core Transformers ¼ to 3 K. W.

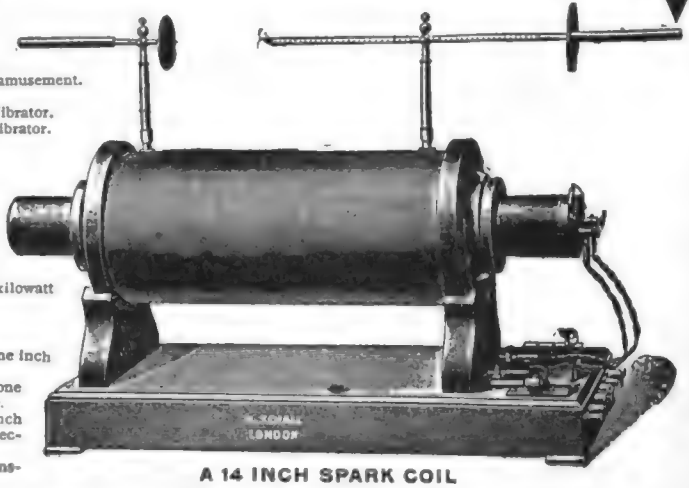

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Table of Glass Plate Condensers, for Transformers up to 5 kilowatt and spark coils 1 inch to 12 inch.
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Tables giving the cost of wire, raw material, etc.

You cannot afford to be without this book, the very latest on the construction of any size induction coil or high potential transformer for use in wireless telegraphy or X-ray work.

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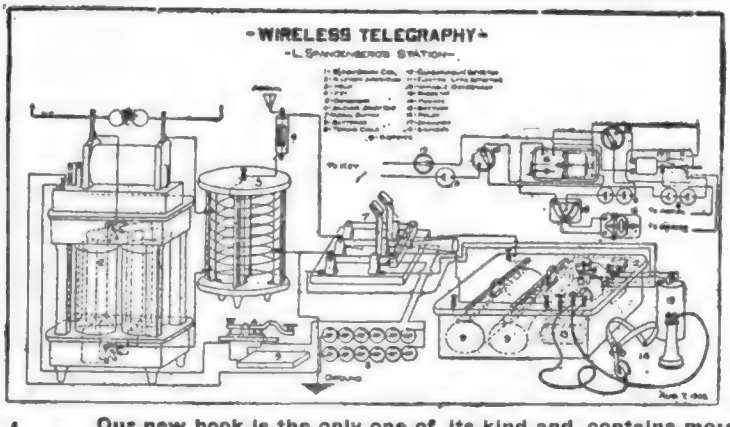

How to Make

a loose coupler.
a microphone detector.
a simple antenna.
a spark gap muffler.
a 1000-ohm relay.
a carborundum detector.
a bare point electrolytic detector.
a selective tuner with weeding out circuit.
a coil vibrator attachment.
an electrolytic detector.
suspend and insulate aerials.
an iron pipe aerial.
a tantalum detector.
a small transformer.
a transmitting helix.
a potentionmeter.
an interupter and detector combined.
an electrical resonance apparatus.
a wireless without aerial.
a talking condenser.
a two-mile wireless station.
a tuning coil.
a silicon detector.
the simplest and most efficient wave detector.
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Our new book is the only one of its kind and contains more information on the construction of wireless instruments and apparatus than any book ever published—no matter what its price.

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A book that every experimenter and amateur in the wireless art must possess.

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These sets are equipped with our new telescoping stropping handle, safety razor and ten blades in metal tubes. The Pocket Set is heavy nickel-plated, packed in a handsome black keretol case. The De Luxe Set is quadruple silver-plated, packed in genuine English Pigskin Case.

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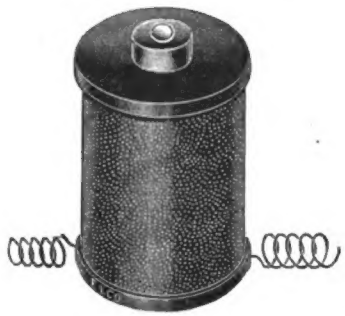
ELECTRO MAGNETS

(Patented Dec. 20, '10)

For Sounders, Bells, Relays and Wireless Instruments, etc.

Illustration Full Size



01107

Our Electro Magnets are well made with fibre ends. Copper wire used being double cotton covered. Magnets are covered with mottled paper. The core is of very best soft Norwegian iron, and each core at the top has a silver contact riveted into same as shown, which may be used for making contact. This is an important feature patented by us and serves to make a contact which of course eliminates another contact arm or standard.

Size over all 15-16 by 1 1-2; diameter of core 3-8 inches.

Three styles carried in stock.

No. 01107 Electro Magnet 20 ohms, **0.22,** by mail extra 4c.

No. 01108 Electro Magnet 50 ohms, **0.26,** by mail extru 4c.

No. 01109 Electro Magnet 75 ohms, **0.30,** by mail extra 4c.

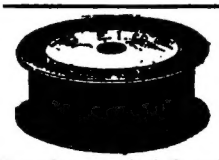
WIRELESS TELEPHONE TRANSMITTERS

6080a

This is one of the best transmitters for use in wireless telephony and long distance wire telephony. This transmitter will stand a current of 1 ampere without overheating and is just the thing you are looking for. Size of instrument 3 1-2 in diameter and 1 1-2 inch thick. This instrument is of the carbon type and will not heat unduly. The weight of the transmitter is 12 ozs. If you have any experiments to make necessitating a strong microphonic current you will find this receiver to do all that we claim for it.

Case is fully nickel plated and polished. Fine finish throughout.

No. 6080a, price **$1.75,** postage, extra 2cc.



All our wire comes on handy tin spools

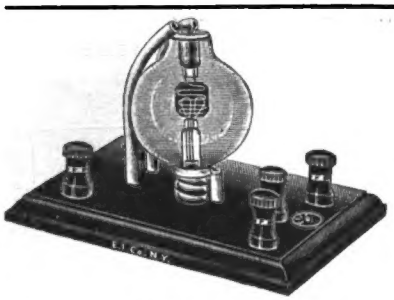
Great Sale of Magnet, German Silver, and Black Enameled Wire

During this month only we will accept any order in sizes from 14 B. & S. to No. 24 B. & S. in either Magnet, German Silver or Black Enameled Wire at a special discount of **25 per cent. of the list price,** as given on page 23 of our catalogue, provided not less than 1 lb. is ordered of any one size. On sizes 24 and 40 B & S a discount of 25 per cent. is also allowed on the three kinds of wire, providing the quantity is not less than one-half lb. of any one size.

For instance No. 26 D. C. C. Magnet Wire listing at $1.00 a pound, price this month will consequently be 75c. a pound.

If any wire is to be mailed add to the price at the rate of 18c. per pound for mail charges.

THE "ELECTRO" AUDION



After long deliberation, we herewith present the best audion manufactured today in the U. S. It is a well known fact that the audion is as sensitive as the Electrolytic Detector and in a great many cases it has proved far more sensitive than the former. The one important feature of the audion is that the signals come in from 5 to 10 times louder than in any known detector.

The audion is not a new instrument but has been known for some years and is used today by mostly all Governments and most of the Commercial stations. It is the only detector that is of any use in Wireless Telephony, for singing spark and quenched spark signals which latter cannot be received with an ordinary detector. This instrument will bring in distant stations which cannot be heard even with the most sensitive Electrolytic Detectors and once used will be preferred over any other detector on account of its great clearness and distinctness.

The construction of this instrument is so that it will not get out of order and the greatest advantage is that no adjusting is ever necessary. The audion will always respond as soon as the current is switched on. The audion must be used on a 4-volt battery either dry cells or storage battery, but must in all cases be used in connection with a rheostat carefully adjusted, and for this purpose, we especially recommend our $0.50, No. 5,000 rheostat, which is unexcelled for this purpose. Further adjusting is not necessary, all that is necessary is to turn on the switch and the detector is instantly ready for use; no potentiometer is used. The instrument comes with a beautifully finished base; there are 5 hard rubber binding posts. Full instructions given with each instrument. Size of the base 5 1-4 in. x 3 1-2 in. Height 3 1-2 in., weight 1-4 lb.

Price complete as per illustration $4.00. By mail extra, shipped in heavy wooden box, 25 cents.

ANTENNA INSULATORS

10341 9461 1166

These insulators have proved so popular and are now used in so many stations that we felt that more readers of MODERN ELECTRICS should take advantage of them and consequently are listing them specially for this month.

These insulators during one year and a half proved to be superior of composition and other style insulators and are practically indestructible. We guarantee them to do all we claim for and will cheerfully refund the purchase price if they are not what we claim for them.

Many amateurs are using of late porcelain cleat insulators, which of course are not fit to be used, in as much as a simple test with a spark coil will convince anyone that a high tension discharge passes right through them, consequently in a sending outfit 30 per cent. of the power is lost and in a receiving outfit as much as 20 per cent. of the received energy goes to waste.

Why not use a GOOD insulator and do away with your leakage?

No. 9461 is made of brown, TRIPLE glazed porcelain; size 2 1-4x2 1-2 in., weight 12 oz., for receiving only. Price **10 cents.** Per doz., **$1.15.**

No. 1166 is made of glass entirely, the most beautiful insulator ever made. Size 2 1-4x2 1-2 in.; weight, 11 oz., for receiving only. Price each **12 cents.** Per doz., **$1.35.**

No. 10341 (patent applied for). This insulator is made of the same material as No. 9461. It is longer and heavier. Its body is pierced by two round holes, through which the wire loops pass. For sending up 2-in. spark length. Will not leak. By placing several of these insulators in series, large spark coils or transformers can be operated without fear of leakage. Size, 3x2 1-4 in.; weight, 14 oz.. Price each, **16 cents.** Per doz., **$1.85.**

SLABY-ARCO VACUUM COHERER

This is an Imported Exhausted Coherer; the most up-to-date and the most sensitive one made. Used by eight different Governments. Has solid silver plugs, and German silver sleeves. The lightest tapping decoheres the instrument. When used with a fairly sensitive relay, messages **for over one hundred miles are easily caught** to work a sounder, etc. Standard tuning coils and condensers can be used in connection with the Coherer. Each instrument fully guaranteed.

Now $2.25

Regular price, $7.50
By registered mail, extra 16c.

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NEWS

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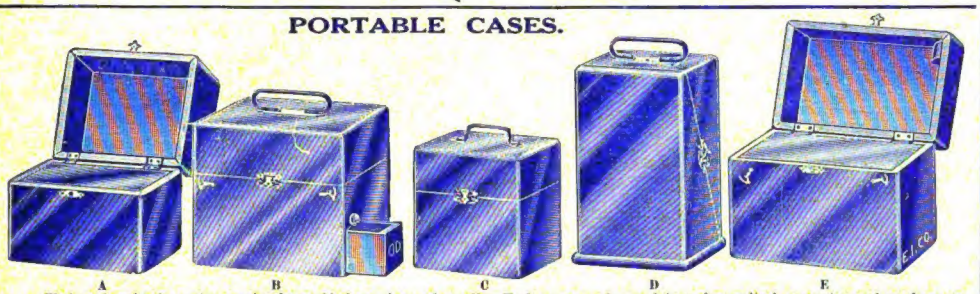


We have bought the entire supply of portable boxes from a large New York concern who used to make medical apparatus and we have on hand now several hundred boxes which we positively are selling **25 PER CENT. BELOW THEIR ORIGINAL COST.**

If you can prove to us that you can get any of these boxes within 30 per cent. of the price at what we are offering them, we will give you any box you may select **FOR NOTHING.** These boxes are all of high grade hardwood, and the ones marked mahogany are of the best genuine mahogany. The finish is of a high order, hand rubbed and polished throughout; all boxes have well rounded corners. Each box has a fine nickel plated heavy carrying handle and fasteners, and the box is guaranteed to be **ABSOLUTELY NEW AND UNUSED.** All boxes have an inside removable top cover on which instruments may be fastened. These boxes are the greatest bargain we ever offered and we doubt whether we will have many of them left at the end of this month. If any one of the sizes are sold out your money will be returned to you, if you wish it.

These boxes make very handsome portable wireless instrument cases and we have been selling a lot of them at our New York retail store for some time, but they can of course be used for all kinds of other purposes and most every experimenter will find good use for at least one of the boxes as shown. On account of the weight of these cases none can be sent by mail; they must go by express or if a sufficient large order is given at a time, they may go by freight. We will cheerfully refund the purchase price on these boxes if they are not absolutely as represented by us.

ALL DIMENSIONS GIVEN ARE OUTSIDE MEASUREMENTS.

Style A. 6 1-2 inches high, 6 inches wide and 6 5-8 inches long (mahogany). ..... **Price, 75 Cents.**
Style B. 7 inches high, 7 1-4 inches wide and 7 1-2 inches long (birch, with extra bottom drawer) ..... **Price, 85 Cents.**
Style C. 6 inches high, 5 inches wide and 5 1-2 inches long (mahogany) ..... **Price, 50 Cents.**
Style D. 10 inches high, 6 inches wide and 5 3-4 inches long mahogany, diagonal opening) ..... **Price, 65 Cents.**
Style E. 7 1-4 inches high, 7 1-2 inches wide and 9 1-2 inches long (mahogany) ..... **Price, 95 Cents.**
Style F. Not illustrated. 7 inches high, 5 1-2 inches wide and 6 5-8 inches long (mohogany) ..... **Price, 75 Cents.**

THE "ELECTRO" LOOSE COUPLER. (New Style.)

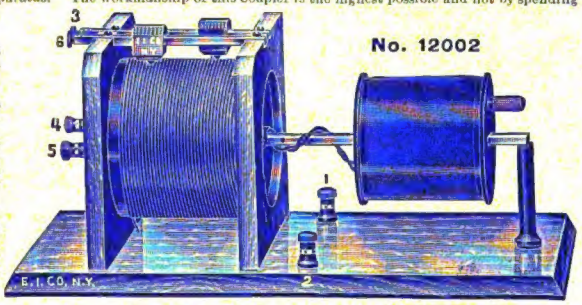
Pursuant to a large demand by our customers for a loose Coupler with a long style Secondary, we herewith present our New Style, which makes a very fine addition to our now extensive line of apparatus. The workmanship of this Coupler is the highest possible and not by spending twice the amount of money would it be possible for us to build a better instrument.

All wood parts are solid quartered oak, dark finish.

The PRIMARY wound with No. 22 is **BARE COPPER WIRE** wound by our patent process. The Instrument has our patent Hard Rubber composition sliders; one red and one black.

The SECONDARY has **solid hard rubber ends** and is **BARE WIRE** wound. Size of Wire is No. 28 B and S., and neat hard rubber handle is provided to slide the SECONDARY back and forward, and in order to do away with loose connections, we use a flexible cord as we have found that this is very much superior to sliding contacts which are always uncertain on an instrument of this kind especially on a SECONDARY.

ALL metal parts are nickel plated and highly polished. There are 6 binding posts; 4 hard rubber ones and 2 metal ones. This instrument is the highest class possible grade and has several other improvements which our old style LOOSE COUPLER did not have. We can confidently recommend this instrument to any one and we will unhesitatingly refund the purchase price if it is not all and everything we claim for it.



Despite the fact that this instrument costs us fully 25 per cent. more to make than our old style, we have not raised the price although we ought to, in justice to ourselves. This instrument is only made in **ONE STYLE,** namely 2 SLIDES; one slide type not being made.

Dimensions: Length of base 12 inches, width 6 inches, height over all 6 1-2 inches; weight 2 1-2 pounds.

No. 12002 "ELECTRO" LOOSE COUPLER, 2 SLIDES, NEW STYLE, Price $4.00.

ELECTRO STORAGE BATTERY.

6 volt 60 ampere hour, size 6 3-4 x 7 1-4 x 7 inches, weight 25 pounds.

This is the best all around battery made to-day and should not be compared with inferior batteries of which the market is flooded now.

This battery is absolutely guaranteed to be **NEW** having **NEW** material throughout; it is not a made over battery like some that have been offered to the public lately.

Every experimenter who wants a **STEADY, STRONG CURRENT** to operate spark coils, lamps, and other apparatus will find this battery to be a great help to him. It can be charged at any garage. There are 5 plates in each cell, 2 positives and 3 negatives. 15 plates in each battery. Case is treated oak, acid proof, and battery has automatic vents and acid proof terminals

This battery is guaranteed to give **200 AMPERES** in short circuit and will melt a No. 10 B. & S. copper wire.

At the price this battery is offered we ship it uncharged without acid and you will have to charge it before using.

No. 555 Electro Storage Battery 6 volt 60 ampere hour, regular price $8.00

This month, $7.00.

No. 556 Electro Storage Battery 6 volts 40 ampere hour, regular price $6.25.

This month, $5.85.

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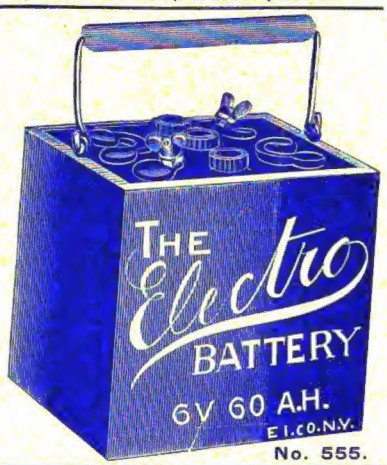

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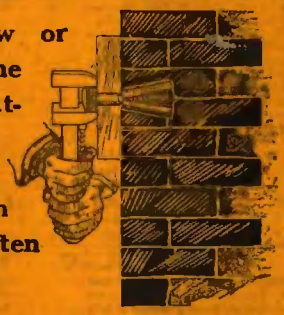
For Fastening to Brick and Stone

¶ Make a hole of the required size with a Sebco Drill.

¶ Place the Expansion in the hole.

¶ Run the screw or bolt through the article to be attached, then into the expansion and fasten tight.



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